CONSERVE TODAY . THRIVE TOMORROW

# PHARMA FEST 2026

SEASON 13

NSUPC PRESENTS

## CONSERVE TODAY THRIVE TOMORROW

*In Association with*

**Department of Pharmaceutical Sciences**
**North South University**

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# CONSERVE TODAY, THRIVE TOMORROW

## Reimagining Pharmacy for a Sustainable Future

Imagine the Earth of 2090. Rivers that used to run with fresh water now run with a toxic blend of pharmaceutical leftovers that won't wash away. Aquatic ecosystems are dead, and freshwater sources are contaminated with pharmaceuticals at sub-therapeutic levels that cannot be filtered out of the water. Patients wait in crowded hospitals with no hope for treatment, as superbugs, developed in polluted rivers due to years of antibiotic use, run rampant. Years of valuing the throughput of medicines over sustainability have left us with an ecology in ruins. In this bleak world, we have polluted the environment essential for survival in our efforts to heal the diseases of mankind through medicines.

Such an occurrence might seem far-fetched, but it is the final result of an attitude toward medicine which regards the environment as a source which has no limits of supplying us with raw material as well as being a bottomless pit for pharmaceuticals. Therefore, to put a halt to such a trend, the theme of this year's Pharma Fest 2026 is "Conserve Today, Thrive Tomorrow."

### Decoding the Theme: A Plea for A Better Future

The motto calls for a complete change of attitude toward medicines. The pharmaceutical sciences have seen phenomenal developments over the past century, from increased longevity to eradication of infections and improved living conditions worldwide. However, these developments have been made within an unhealthy insulation in which human health was separated from planetary health.

The theme acts as a message that health of humankind is impossible on an ill planet. It is important to understand that conservation today is not sacrifice but a condition of thriving tomorrow. It calls all scientists, clinicians, industrialists, and students to realize the fact that every molecule, production cycle, and package discarded comes at a cost of ecology. Any advance in medicine should heal the patient and not poison the planet.

### Representing the Transition: The Magazine Cover Design

The cover brings together pharmacological science and environmental stewardship through a unified theme. In the center lies a luminescent, liquid-like ball representing our planet and life itself. Around it is a cluster of hexagonal symbols that link various important foundations of medicine, such as pharmacotherapy, laboratory synthesis, and microbiology, directly to the ecological actions, such as recycling and carbon reduction. The central network is supported by a background of a DNA structure, combined harmoniously with greenery. The above combination creates a united picture of green and sustainable healthcare as not two different sciences, but one ecosystem where the conservation of nature is necessary for human health advancement.

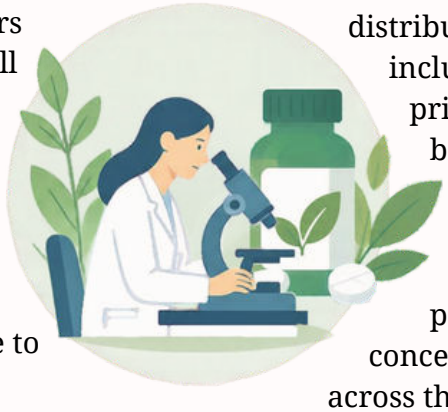
## Myth of “Green” versus Reality of Sustainability?

Translating the vision into real-world actions requires us to dispel a myth prevalent in contemporary chemistry: the myth that “green pharmacy” equals “sustainable pharmacy.” As environmental chemist Klaus Kümmerer points out, the conventional notion of “green chemistry” has been limited to the synthesis and manufacturing process of a drug. “Green metrics” such as increased atom economy, decreased use of organic solvents (the E-factor), and using renewable feedstock are all critical operations that help to limit pollution from industry. However, a drug produced in a “green” manner can be environmentally harmful if the active pharmaceutical ingredient (API) is non-degradable and is hazardous when excreted into the environment. For instance, a pharmaceutical company could rely on energy-efficient micro-reactors and renewable plant-based raw materials to manufacture an antibiotic. Even though the manufacturing process is “green,” if the antibiotic drug remains intact in the body, is not degraded during the wastewater treatment process, and persists in the natural water bodies, it contributes to antimicrobial resistance and impacts aquatic biodiversity.

## Implementation of Sustainability throughout the Pharmaceutical Lifecycle

To make the pharmaceutical industry truly sustainable, certain measures need to be taken at all the stages of the life cycle of a medicine:

- **Benign by Design:** Instead of building expensive wastewater treatment facilities to degrade drugs in the environment, pharmaceutical researchers should design APIs that will readily biodegrade after use. It is necessary for an API to have high affinity for receptors in the human body, yet quickly degrade to non-hazardous metabolites after exposure to sun, water or bacteria.



- **Ecopharmacostewardship and Circular Production:** It is vital for manufacturers to consider circular production and distribution processes, which should include minimal carbon foot printing, use of recyclable and biodegradable packaging materials, as well as implementation of stringent ecopharmacovigilance procedures to keep track of drug concentrations in the environment across the globe.
- **Rational Prescribing and Drug Take-Back Systems:** It has been estimated that between 10 percent to 35 percent of the prescribed medicines are unused and end up either being disposed of through drains or in general refuse facilities. Physicians and pharmacists can play an important role in prescribing precise package sizes, educating patients on proper medication disposal techniques, and implementing drug take-back schemes.

## A Collective Responsibility

Pharma Fest 2026 stands at the beginning of a new era. The threat of chemical contamination in a post-apocalyptic world is on the horizon, but our destiny still remains unwritten. It is through the embracing of more advanced green measures, sustainable engineering through all phases of product development, and the development of an environmental ethic that the worldwide pharmaceutical community will be able to create a rich and flourishing tomorrow.

***Written by***
***Ahmed Ibrahim, 242***

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# Messages

**Aziz Al Kaiser**
Chairman
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It gives me immense pleasure to welcome all participants, faculty members, guests, and industry leaders to Pharma Fest 2026. This epoch-making event, organized by the North South University Pharmaceutical Club (NSUPC), is a great celebration of creativity and academic achievements, featuring a stall exhibition, an olympiad, debate competitions, poster exhibitions, and the much-anticipated cultural events.

Distinguished alumni, seasoned professionals, and healthcare specialists will inspire the next generation of pharmacists by offering invaluable real-world perspectives. Within the ever-changing landscape of healthcare, events like Pharma Fest play a vital role in preparing students to meet tomorrow's challenges with wisdom and confidence.

I extend my warmest congratulations to the chairman, faculty advisor, the dedicated organizing committee, and all participants for their tireless efforts in making Pharma Fest 2026 a reality. I sincerely hope this celebration sparks meaningful conversations and leaves every attendee inspired. My sincerest wishes for your success.

**Dr. Abdul Hannan Chowdhury**
Professor & Vice Chancellor
North South University

A flagship event at North South University, Pharma Fest is something we look forward to every year. It is an all-encompassing festival where we get to witness the talents of future pharmacists amid the wave of celebration that sweeps all across campus. The fest hosts debates, olympiads, poster presentations, scientific stalls, as well as a vivid cultural program, nurturing valuable skills in students beyond academics.

Each year, the Department of Pharmaceutical Sciences also ensures that students experience the convergence of academia and industry through Pharma Fest, which brings industry professionals and students under the same roof. The fest also strengthens inter-university relations through the competitions it holds.

It is incredible to be a part of an event that is the result of months of hard work, dedication, and teamwork by the North South University Pharmaceutical Club (NSUPC). A heartfelt congratulations to all the students and faculty who have worked tirelessly to bring Pharma Fest 2026 to fruition.

I am extremely thrilled yet again to witness the innovation, grandeur, and excitement that Pharma Fest brings to the table every year. This fest's energy and creativity radiate across the entire campus, filling my heart with immense pride. It's not only a grand event, but an epitome of the incessant hard work, dedication, and legacy carried by North South University Pharmaceutical Club. Pharma Fest is a bridge between our students and the vast world of the pharmaceutical industry, research, and science.

I'm especially glad to see students taking the lead in both participating and organizing the event with such genuine passion and commitment. I sincerely hope Pharma Fest continues to encourage students to deepen their understanding of emerging trends in the health sciences and to grow into well-rounded professionals in the field.

I would like to extend my utmost gratitude to the faculty members, the department, the club, and the staff for making this fest a success.

Nasar U. Ahmed

**Dr. Nasar U. Ahmed**
Professor & Pro-Vice Chancellor
North South University

The Pharma Fest, a much-anticipated annual event, is back with innovations and exciting activities. It has become an important annual celebration of pharmaceutical sciences, bringing together education, new ideas, creativity, and teamwork.

It provides our students with a meaningful opportunity to apply their academic knowledge and research interests into valuable experiences through participating in debates, olympiads, stalls, and poster presentations. As the pharmaceutical field evolves, it is important for aspiring pharmacists to integrate classroom learning with the challenges faced in healthcare to address the industry's growing needs. North South University remains dedicated to developing competent and innovative professionals who aim for excellence.

I am confident that Pharma Fest 2026 will encourage new ideas, build connections, and help our students expand their understanding beyond the classroom. I congratulate the entire pharmaceutical club, the respected faculty members, and the participants for organizing such a colorful and memorable event, providing valuable experience for each and every participant in the Pharma Fest 2026.

**Dr. Abdur Rob Khan**
Professor & Treasurer
North South University

**Dr. Dipak Kumar Mitra**

Professor & Dean,
School of Health and Life Sciences
North South University

It is indeed a great pleasure for me to be a part of Pharma Fest 2026, organized by North South
University Pharmaceutical Club. Over the years, Pharma Fest has become an excellent platform for students to showcase their excellence in knowledge and ideas beyond the classroom. It is absolutely wonderful to see collaborations not only among students but also among faculty, industry, and healthcare professionals.

I am quite delighted to see the students participating and organizing the event with such fervent dedication. I'd like to extend my sincere appreciation to all the faculty members, organizers, and industry partners whose support has made this event possible. I truly hope Pharma Fest continues to inspire students to become more knowledgeable about health science trends and to become well-rounded healthcare professionals in the future.

I wish everyone a meaningful and successful Pharma Fest.

**Dr. Iqbalur Rahman Rokon**

Director, Office of Student Affairs
North South University

Year-round, we get to witness the multifaceted talents of our students from various departments. The annual Pharma Fest organized by the Department of Pharmaceutical Sciences is one such event.

Both the academic segments, such as debate, olympiad, poster presentation, stall exhibition, and the creative segments, such as ramp walks, dancing, and singing, showcase the knowledge and skills desired in a well-rounded student body. This grand event, teeming with endless possibilities, not only encourages students to delve deeper into healthcare and research but also offers them an opportunity to realize their full potential.

It is truly an honor to have brilliant minds from both academia and industry gather here and witness this spectacle of a budding promise.

I congratulate the entire organizing body, the faculty advisor, the relentless club members, and the volunteers for making an event of this scale possible. I believe the Pharma Fest will continue to reach new heights.

Progress in the field of pharmaceutical science involves our accomplishments and our ability to be responsible for our future with discipline. As Pharma Fest 2026 approaches, I am honored, as the Chairman of the Department of Pharmaceutical Sciences (DPS), to greet all students, participants, sponsors, organizers, faculty members, alumni, and distinguished industry professionals.

Pharma Fest has always been an important event that serves as an essential link between academic pursuits and industry, fostering dialogue among universities. This year, the festival will focus on the theme “Conserve Today, Thrive Tomorrow” through our main activities, including the Pharma Olympiad, Pharma Debate, Stall Exhibition, and Cultural Night.

The significance of this festival for me lies in its expression of our students' initiative, dedication, and intellectual curiosity. I want to extend my heartfelt thanks to all the faculty and staff members of DPS, the faculty advisor, the members of NSUPC, and the rest of the organizing team.

Together, let us commit to “Conserve Today, Thrive Tomorrow” as we build a sustainable and resilient future for global healthcare.

**Dr. Mohammad Hossain Shariare**
Professor and Chair
Department of Pharmaceutical Sciences
North South University

As the Faculty Advisor of the North South University Pharmaceutical Club, I welcome the 13th Season of Pharma Fest with open arms. In an era that celebrates festivity, showmanship, brilliance, and collaboration, the Pharma Fest has evolved from a modest gathering of compassionate, enthusiastic minds into an exceptionally grand event that showcases our talents across numerous platforms.

I formally welcome the participants to seek opportunities to connect and engage with industry professionals, leading researchers, and our very own cooperative alumni body, AANSUP. Such meaningful engagements can nurture our talents into greater forces within the evolving landscape of pharmacy and healthcare. It has been an honor to be part of this incredible journey, watching diligent club members, participants, and volunteers pool their efforts to shape this year’s event.

To make this year’s Pharma Fest a triumphant success, I would like to take a moment to congratulate the faculty members and organizing committees who helped bring this event together and celebrate intellect, camaraderie, and creativity. I wish this year’s Pharma Fest reignites the spirit of camaraderie once again and becomes a cherished memory for years to come.

**Md. Adit Muktadir Pavel**
Senior Lecturer
Department of Pharmaceutical Sciences
North South University

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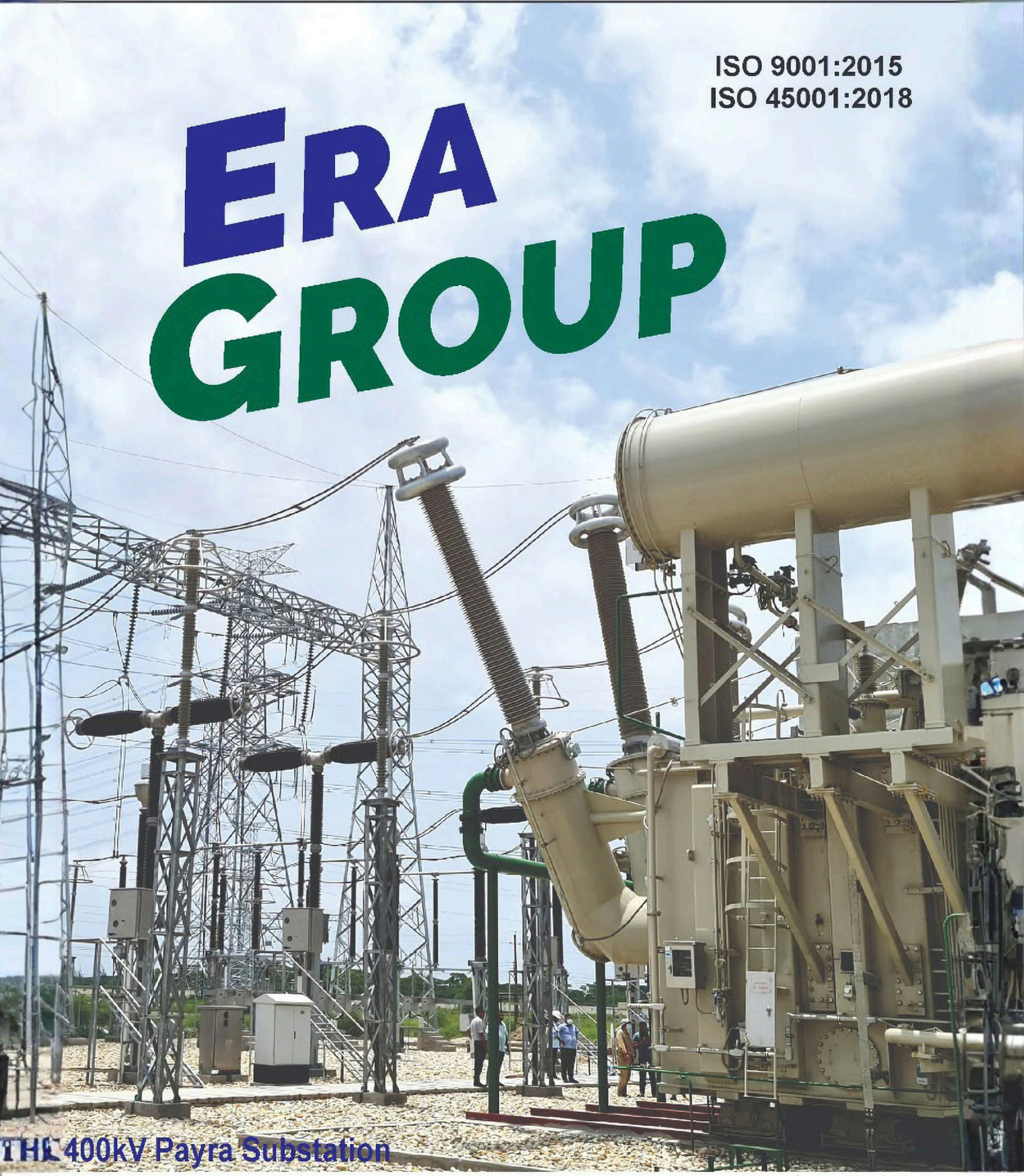
# ERA GROUP



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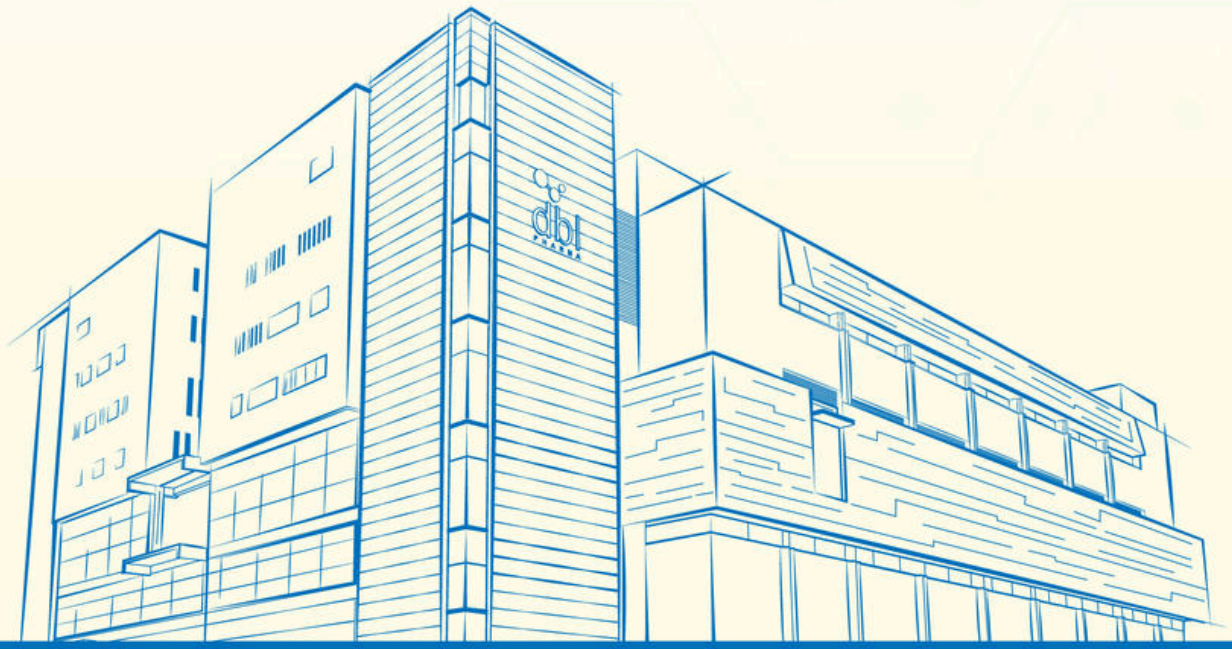


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# WELCOME TO THE CLUB

**T**he North South University Pharmaceutical Club (NSUPC) is a vibrant platform that extends beyond the traditional framework of a club. It brings together students of the department from all batches, along with our esteemed faculty members in order to empower the students into making it one of the most prominent clubs at NSU.

The club organizes educational workshops, seminars, webinars, and exciting events under the guidance of our dedicated Faculty Advisor and the Executive Body (EB) Panel. NSUPC provides a wide array of opportunities, ranging from inter-university competitions to competitive sports events, providing a platform for students to showcase their talents, develop their skills, and build lasting connections. In addition to these, various seminars and webinars hosted by world-class researchers and pharmaceutical industry professionals are organized by the club, in collaboration with the Department of Pharmaceutical Sciences at North South University.

Like every year, Pharma Fest, the club's flagship event, returns with the theme “Conserve Today, Thrive Tomorrow” which reflects our commitment to a sustainable future. Along the Pharma Fest, this year, the department will also host the International Conference on Pharmaceutical Sciences to foster international collaboration, exchange knowledge, and build lasting connections with leading researchers and pharmaceutical industry professionals who are advancing the healthcare industry.

# NSUPC
## 2026-2027

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Md. Salequzzaman
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Md. Asif Iqbal
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Nishat Tamanna Chowdhury
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Logistics
Forhadu Zaman

Public Relations
Saikat Khan

Cultural
Fuad Al Muktadir

Photography
Abdullah Al Abir

Graphics
Md. Mehrab Ali

Sponsorship
Ahmad Fardeen

Sports
Imtiyaz Rabbi

Decoration
Shatabdi Biswas

Social Service
Hasin Ishrak

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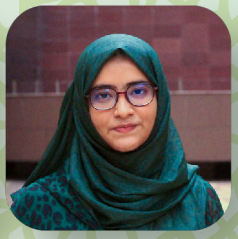
Sponsorship
Tamzeed Hussain

Decoration
Shahrin Hamid



Graphics
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Sports
Imtiaz Rabbul

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Md Delower Hossen

Ahmed Shahriyar Romel

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Azmain Arif

Sara Binte Hoque

## Photography

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Sameen Yasar

## Graphics

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Lamisa Lutfar

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Mahmud Hossain Rivu

Noshin Anjum

## Decoration

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Nishat Tasnim Orthy

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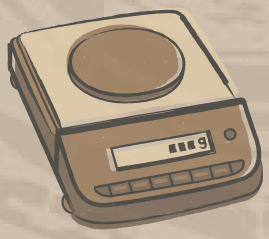

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Moin Ahsan

Shadman Hossain Siam

Tanjim Hasan

## Social service

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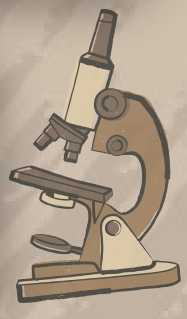
Nazmus Sadath

Siam Muntasher



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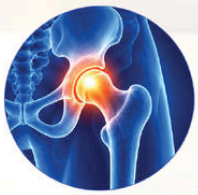

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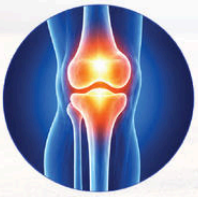

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# PHENOLIC COMPOUNDS: FROM PLANT PIGMENTS TO HEALTH PROTECTION

**Dr. Nusrat Sobhan**
**Professor**

Have you ever visited a produce market or a shopping mall? You will definitely find fresh, vibrant, natural fruit and vegetables such as cabbage, carrots, broccoli, radishes, apples, grapes, etc. Sometimes, you also observe that cauliflower can be white, purple, or yellow. Many flavonoids contribute to the color of plants, particularly flowers, fruits, and leaves. Flavonoids such as quercetin and kaempferol are responsible for the yellow pigmentation observed in certain flowers and fruits. However, not all flavonoids are colored, and not all plant pigments are flavonoids.

**What are flavonoids?**

Flavonoids are a large group of naturally occurring polyphenolic compounds found mainly in fruits, vegetables, flowers, tea, and medicinal plants. Phenolic compounds are characterized by one or more hydroxyl (-OH) groups attached to an aromatic ring structure. The structural diversity of the flavonoids is characterized by a common $C_6$–$C_3$–$C_6$ carbon skeleton. Structural differences are influenced by the number, position, and arrangement of hydroxyl groups, which give rise to different flavonoid subclasses (Fig. 1). Structurally, they include over 8000 molecules or derivatives which consist of flavonoids (quercetin, kaempferol, naringin, etc.). These compounds are primarily synthesized through the shikimate and phenylpropanoid pathways, which are regulated by environmental factors such as light, temperature, and biotic stress [1].

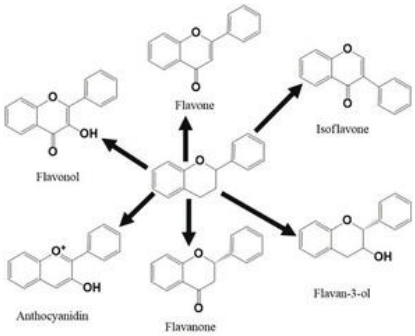


**Fig. 1:** Basic structure of different flavonoids found in nature

**Why are they important for health?**

Plants use polyphenols for defense and pigmentation. Recent research highlights their interaction with gut microbiota and the formation of beneficial metabolites [2]. Dietary polyphenols may modulate numerous signaling pathways at the cellular and molecular levels, and they have bioactive molecules with diverse applications in human health. Their most notable property is antioxidant activity, mediated by hydrogen donation, radical scavenging, and metal ion chelation [3]. These mechanisms protect individuals against oxidative stress and inflammation, which are at the basis of many chronic degenerative diseases, including cardiovascular disorders, hyperglycemia, neurodegenerative conditions, and certain cancers [3,4]. Additionally, phenolic compounds exhibit anti-inflammatory, antiviral, and hepatoprotective activities. For example, flavonoids such as quercetin and catechins modulate inflammatory pathways and inhibit the growth of pathogenic bacteria, while resveratrol has cardioprotective and anti-aging effects [1]. Phenolic compounds support health biomarkers but show low bioavailability due to poor solubility, instability, and extensive metabolism [5,6]. Their health effects depend on the type of polyphenol, dose, bioavailability, metabolism, and the food or extract in which they are present. Technological advances are improving the recovery and stability of phenolic compounds. Extraction methods—such as ultrasound, microwave, and supercritical fluid-assisted techniques—offer efficient and sustainable alternatives [7]. Encapsulation approaches using nanoemulsions and biopolymer-based carriers enhance solubility, stability, and bioavailability [8]. However, limited studies address their biocompatibility, safety, and long-term effects in humans, while high costs and scalability issues hinder their wider therapeutic use.

In conclusion, phenolic compounds show promising potential in human health. Future research should aim to improve bioavailability and gain a mechanistic understanding. Thus, phenolic compounds serve as a valuable link between plant science, nutrition, and medicine.

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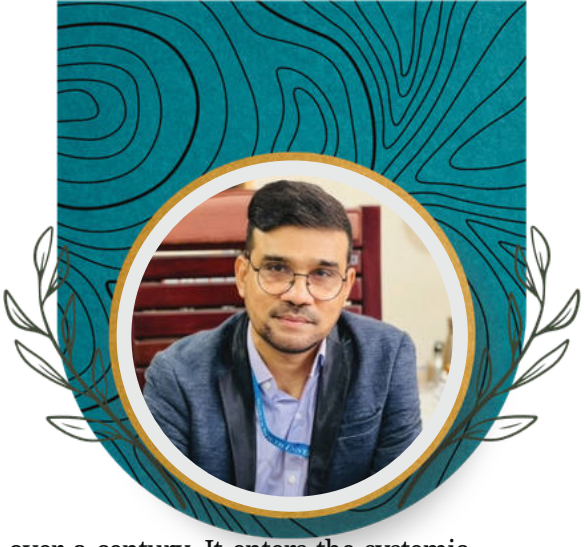
# ORAL NANO-INSULIN THERAPY: HOW FAR ARE THE SCIENTISTS?

**Dr. Mohammad Borhan Uddin**
**Associate Professor**



Subcutaneous insulin has been the standard treatment for diabetes for over a century. It enters the systemic circulation directly and reverses the physiological portal-to-peripheral gradient. Endogenous insulin reaches the liver at roughly two- to four-fold the systemic concentration. Hepatocytes extract 50-60% of the hormone on first pass, which limits peripheral exposure. Subcutaneous injection allows insulin to enter peripheral vascular beds directly, and suppressing hepatic glucose production requires doses that produce chronic peripheral hyperinsulinemia. The consequences include weight gain, worsening insulin resistance, and hypoglycemia. Absorption from the subcutaneous depot also varies with blood flow, injection depth, and lipohypertrophy, which adds pharmacokinetic variability to each dose.

Oral delivery addresses these limitations at the physiological level. Insulin absorbed across the intestinal mucosa drains into the hepatic portal vein, restoring the hepato-portal gradient and allowing direct receptor mediated control of hepatic glucose output at lower total doses. Removing the injection burden may also support earlier initiation of insulin therapy in type 2 diabetes. The obstacle is bioavailability. Insulin is a hydrophilic peptide of 5.8 kDa, and it is degraded by gastric acid and by pepsin, trypsin, and chymotrypsin before it meets the mucus layer and tight junctions of the epithelium. The native oral bioavailability is below 1% .

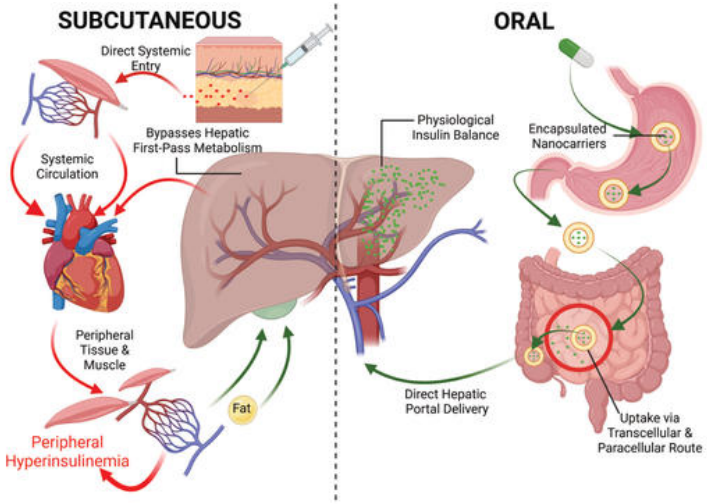



**Fig.:** Oral & subcutaneous insulin delivery systems

Nanocarriers improve on this considerably in rodent models. Chitosan-alginate core-shell particles reached 8.2- 11.8% bioavailability, and chitosan-graft-PAMAM/alginate particles reached 11.78%. Hyaluronic acid-coated particles, which exploit CD44-mediated uptake, achieved 9.4%. Dextran-b-PLGA polymersomes gave 9.3% relative bioavailability with normoglycemia sustained for 12 hours, and vitamin B12-functionalized calcium phosphate particles gave 6.26%. Among inorganic systems, virus-mimicking mesoporous silica raised jejunal bioavailability 2.1-fold, and Zr-based metal-organic frameworks released less than 10% of their payload at pH 1.2 while loading up to 40% w/w. Overall, polymeric carriers raised absorption roughly six- to twelve-fold above the unprotected baseline. Phenylboronic acid hydrogels added glucose-responsive release and maintained normoglycemia for 24 hours in diabetic mice.

These data carry limitations as the results come from rodent studies, the reported endpoints differ (absolute, relative, or pharmacological availability), and exposure remains well below that of subcutaneous dosing. By resolving batch variability, modest loading in polymeric carriers (5-25% w/w), and GMP-compliant scale-up, clinical translation can be implemented.

**Scan for References**

# MIND THE GAP: WOMEN TRANSFORMING STEM

**Dr. Tabinda Islam**
**Assistant Professor**

There are phases in women scientists' lives when questioning their capability becomes secondary to finding the courage to forge ahead. Within our cultural norms, women choosing a careerin science may sometimes appear to be nurturing an "unfamiliar dream".

While doing science can be challenging at times, the key challenge isn't always limited to laboratory work or spending nights reading scientific literature. Often, this journey meets a daunting glass ceiling- an invisible barrier built from deeply ingrained family expectations, social responsibilities, and cultural setbacks.

I stepped into science in my teens with curiosity and uncertainty, yet I chose to pursue it as a long-term career. Years later, that curiosity took me to London and introduced me to the fascinating world of molecular neuroscience. During my PhD, I explored neurohormone signalling using an unusual model organism. In those four years of diligent journey, my research taught me that the most challenging part of science is not just finding answers but asking better questions to unravel what we think we already know. Yet my journey in science was never only about experiments, writing papers, and presenting at conferences. I was also learning to build a research career by training young scientists in my PhD research lab while raising my child. There were days when balancing work and family was challenging; however, motherhood did not make my journey easier, but it changed me into a version of myself I never knew existed. It endowed me with immense patience, strength to cope with disappointments and the ability to see the difficulties in life from a different perspective.

My journey in science has been deeply shaped by women working in schools, universities, hospitals, and small research labs. They are all chasing their dreams while sharing parental, family and social responsibilities. Their roles are significant in shaping our society towards equity and sustainability. If we look back into history, we see female scientists who dared to walk on unfamiliar paths. From Marie Curie to Rosalind Franklin, their contributions to science remind us that pursuing knowledge does not require immediate recognition; rather, it requires a fearless mind, dedication, and discipline. The representation of women in STEM fields should be emphasised by recognising their contributions in science and practising equal leadership opportunities in these sectors. At present, Bangladesh needs more women to enter laboratories, lead research, and generate innovative ideas that could improve life and benefit a wider community. Today, standing on the other side of the classroom, I look at my young female students who may one day become scientists, teachers, leaders, and mothers.

I want them to know that they do not need to doubt whether they should pursue a scientific career or build a family; they can dream of both. My journey in science is still emerging, but I hope it becomes part of a growing community of Bangladeshi women who will question, discover, build, lead and inspire. The future of science needs their knowledge, creativity and courage. We therefore need targeted initiatives that encourage girls to enter science from an early age, support women throughout their careers, and welcome them back to work after a break to avoid career retention. Perhaps our greatest contribution is not only to advance knowledge but also to create more space for women who dream of walking the same path someday.

*Key message: The metaphorical undertone of the article's title emphasises the danger of ignoring women's contributions to science, which may cause women and their potential contributions to "fall through the cracks"*

# WHAT A STARVING CELL KNOWS THAT NO ARTIFICIAL INTELLIGENCE DOES

**Dr. Nadia Saffoon**
**Assistant Professor**

Cells can sense lack of oxygen. Does it panic? No! It negotiates!!! How? A protein called HIF-1α acts as the master regulator of oxygen homeostasis and helps cells rewire their entire metabolism. It acts as a critical decision making hub for cell fate. It is one of the essential survival techniques in biology. This concept becomes the root for understanding cancer, stroke, anemia, kidney injury, and many other diseases that scientists are chasing after.

AI driven drug discovery claims that drug design is being redefined by the convergence of computation and chemistry. It is to design better medicines faster, more efficiently, and with a high probability of success. However, none of the attention-grabbing AI drug discovery involves these types of biological questions. When companies like “Recursion” and “Isomorphic Lab” spend billions with big pharma to develop technologies, or “Insilico Medicine” designs an AI-designed molecule (Rentosertib), their main goal is to generate a drug molecule faster than any human could. This is certainly a monumental triumph. But developing a molecule remains the simpler aspect of the story.The difficult part is to discover what truly influences a disease to advances, adaptive homeostatic process, contextual signaling networks behind it, such as the oxygen-sensing pathway described earlier. Next to none of the industry is going there for AI investment, because it is harder to model and slower to monetize than “design me a better-binding compound.”

It's a situation akin to building diagnostic kit to catch rare diseases, while mostly ignoring the toxic environments that cause them. Another blind spot is more applicable for us. These companies are willing to spend hundreds of millions of dollars to build AI-native maps of multimodal biology. Petascale Data aims to treat diseases with paying markets in wealthy countries. This is no criticism of scientists for engaging in such work; it is simply the actual situation where capital plays the driving role. This reflects that the diseases which are detrimental for countries such as Bangladesh-hepatitis-related liver disease, exposure to environmental toxins, and undiagnosed metabolic disorders drop out from this AI revolution race due to its commercial gravity.

For a LDC country like Bangladesh, various notable pharmaceutical innovations such as metabolomics- guided repurposing of drugs we already have or can afford, hepato- and nephroprotective research built on plant-derived compounds that grow in our own fields rather than in a distant compound library looks unglamorous by comparison. It will not succeed in making tech headlines. It is still innovation and arguably exactly what ‘global health advancement’ is meant to look like.

This is not an argument against AI; rather, it is an objection to a narrow conception of progress - one that confuses faster molecule design with having solved biology or that presume solving wealthy market's problems is solving the world's problems. The next genuine breakthrough may not come from building an AI driven fancy model maybe it will come when someone starts asking questions like what a starving cell already knows: that survival is a negotiation, not a shortcut.

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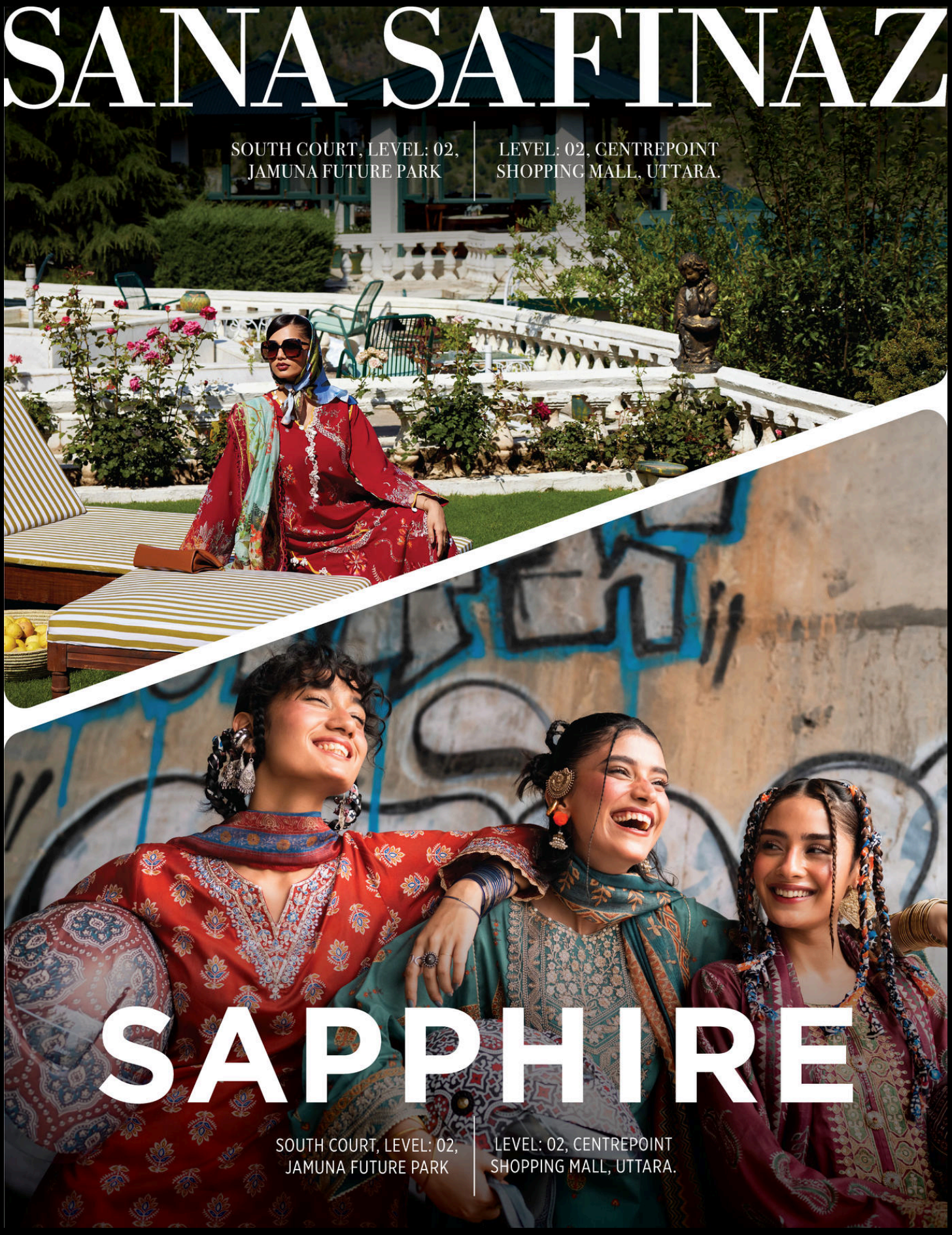
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# PROTEOMIC CLOCK

Fatema Nawar, 222

Student Article

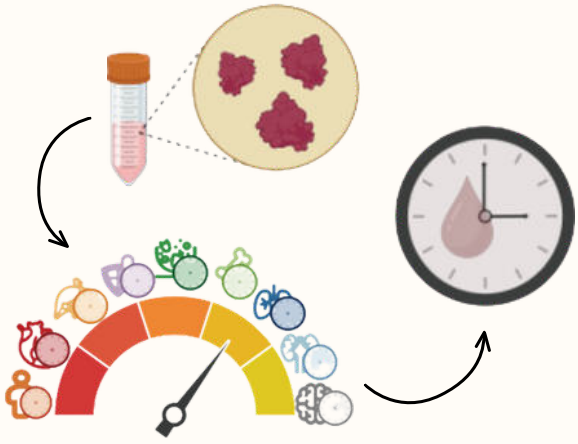
It's easy to count down your birthdays and feel like as if you're much further from the age where an extra slice of cake won't affect on the potential diabetic symptoms. But, what if your vital organs have their own timeline to follow?

Proteomic Clock is a current research for measuring biological age through blood tests. Chronological age of a human can only tell how many years a person has lived but it can't inform on the condition of organs. Two individuals of same age can have varying degree of risks for disease based on lifestyle choices, creating "age gaps" that became the center of study to analyze more on protein-specific aging of human beings.

Proteomic Clock is a significant blood test tool that can measure biological age of a person by examining patterns of circulating proteins. But why focus on proteins? Because loss of protein homeostasis is a fundamental characteristic of aging, hence, require close monitoring of protein biomarkers that provide functional snapshot of aging process. With the use of Mass Spectroscopy, protein identification became easier to work, leading to newer opportunity to find biomarkers responsible for elevated risk of diseases.

For instance, if heart has high amount of proteins that leads to inflammation or cardiac stress, this suggests an increased age for heart muscles. So. If a person is aged 38 years old but his heart's biological age is 55, that means the heart's genomic profile is older and is more prone to getting Cardiovascular Diseases.

Proteomic tests also use the help of Artificial Intelligence to process protein data, detect overlooked protein patterns , compare protein changes among healthy and diseased specimen. A recent 2026 study focused on the discovery and tracking of eye aging related diseases by merging proteomic clock approaches along with Ai based retinal image evaluation. This assessment significantly helped with early diagnosis of ocular disorders.



Pharmacists step in here to curate personal drug therapies for patients to tackle specific conditions early and even develop Geroprotective drugs to improve healthy aging.

Although this process isn't a direct preventive treatment , it still is a prominent tool to screen pre-symptomatic stage of diseases. So, the next time , your reflection shows a younger image, try to also contemplate on the state of the viscera, which could be telling a different story.

# EUPHORIA: WHEN NEUROTRANSMITTERS REWRITE OUR REALITY

Md. Towsif Al Amin, 231

Euphoria is not a state, but an event, and it occurs as a off-stage cascade across four distinct systems that rewrite the nature of reality for a moment.

Through the mesolimbic pathway, dopaminergic neurons in the ventral tegmental area (VTA) project to the nucleus accumbens (NAc), anchoring this cascade with dopamine. The pathway begins with dopaminergic cell bodies in the VTA and projects to the NAc, which is similar to projections into the amygdala and characteristic of lateral hypothalamus. Dopamine is also critical, but it does not code for pleasure per se, so much as encode reward prediction errors and signal rewarding stimuli (Allied Academies), it tells the brain what to do again.

The mu type is the predominant type of opioid receptor that are activated by endorphins. Mu-1 receptors mediate analgesia and dependence, while mu-2 receptors drive euphoria, dependence and respiratory depression. Mu receptor agonists (NCBI), endorphins don't just numb pain; they disinhibit the dopamine reward circuit themselves, blocking GABA release and then indirectly promoting DA transmission in the VTA (Tufts University).

Oxytocin originates in the hypothalamic paraventricular and supraoptic nuclei, released both peripherally via the pituitary and centrally through direct axonal projections to the amygdala and nucleus accumbens.

(Springer) Notably, oxytocin can increase serotonin release within the raphe nuclei, (PubMed Central) linking bonding to mood. Serotonin, meanwhile, modulates affect more subtly, its therapeutic manipulation (via reuptake blockade) rarely produces euphoria, which is precisely what separates it from dopaminergic drugs of abuse.

Pharmacology exploits each pathway differently. Opioid analgesics hijack the endorphin-dopamine link described above. Amphetamines used for ADHD reverse the dopamine transporter, causing dopamine to be pushed out of the neuron rather than reabsorbed, (nih) an effect distinct from methylphenidate's simple reuptake blockade. MDMA acts as a substrate for monoamine transporters, stimulating release of serotonin, dopamine, and norepinephrine while reversing normal transporter flux, (Wiley Online Library) which also explains its history in PTSD research, though it's worth noting the FDA issued a Complete Response Letter rejecting MDMA-assisted therapy in 2024, and it remains investigational.

The line between therapy and abuse rarely lies in the molecule, it lies in dose, receptor selectivity, and the speed of onset that determines whether reward circuitry adapts gently or is overwhelmed entirely.

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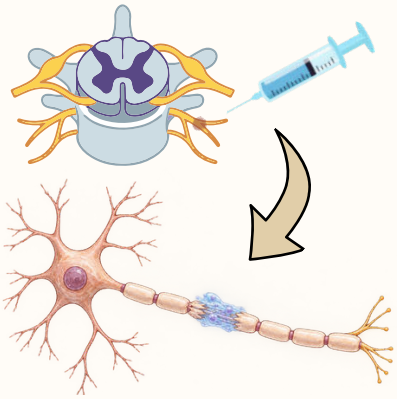
# POLYLAMININ: A NEW HOPE FOR NERVE REPAIR

Amina Maryam, 232

Student Article

Imagine if damaged nerves could repair themselves after a serious injury. For years, this seemed impossible. Today, a biomaterial called PolyLaminin has given researchers a new reason to be hopeful. Developed after more than 25 years of research, PolyLaminin was created by Dr. Tatiana Coelho-Sampaio and her team at the Federal University of Rio de Janeiro (UFRJ), Brazil. The technology was later licensed and developed by the Brazilian pharmaceutical company Cristália. PolyLaminin is a polymerized form of laminin, a natural protein found in the basement membrane that supports cells. Laminin helps cells attach, grow, move, and communicate, and plays an important role in the development and repair of the nervous system. Unlike regular laminin, PolyLaminin forms a stable three-dimensional network that acts as a scaffold where nerve cells can attach and extend new nerve fibers. Animal studies have shown that it supports nerve cell survival and promotes nerve regeneration more effectively than regular laminin.



One of its most promising applications is in spinal cord injury. After such an injury, damaged nerve cells rarely reconnect on their own. PolyLaminin creates a supportive environment that helps these cells survive and form new connections. Researchers are also studying its potential in brain injuries, peripheral nerve damage, and stem cell therapy. In an early human study, eight patients with complete spinal cord injuries received the treatment. Two patients died from complications related to the severity of their injuries. Among the six survivors, all regained some degree of voluntary movement, and one recovered the ability to walk without assistance. Researchers also believe the treatment may work best when given within 72 hours of injury. However, these findings are preliminary and require confirmation in larger clinical trials.

PolyLaminin is still an experimental treatment, and more research is needed before it becomes part of routine medical care. Even so, its early results have drawn attention to the growing field of regenerative medicine. Rather than replacing damaged tissue, PolyLaminin helps create the conditions that allow nerve cells to repair and reconnect. If future studies confirm its safety and effectiveness, this biomaterial could become an important step toward better treatment for spinal cord injuries, nerve damage, and other neurological disorders.

# PCOS TO PMOS:THE RENAMING EXPLAINED

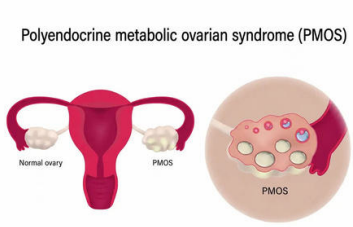
Ramisha Noor, 232

In May 2026, Polycystic Ovary Syndrome (PCOS) was officially renamed Polyendocrine Metabolic Ovarian Syndrome (PMOS) through an international consensus process. The initiative was led by Professor Helena Teede, director of Monash University's Monash Centre for Health Research & Implementation (MCHRI), alongside 56 leading academic, clinical, and patient organizations. The new name, announced in the renowned journal,The Lancet, aims to represent the condition for what it is- a whole-body disorder rather than purely a reproductive one.

According to the WHO, PMOS affects 1 in 8 reproductive-aged women, which equates to more than 170 million women worldwide. Despite such high numbers, up to 70% of cases remain undiagnosed. While the root cause of PMOS is still unknown, experts believe that it is driven by a combination of genetic, metabolic and hormonal factors. Abnormally high levels of insulin and androgen hormones disrupt ovulation, resulting in the formation of 'cysts' in the ovaries. This also leads to many of the familiar symptoms of PMOS, such as irregular menstrual cycles, severe cramps, heavy menstrual bleeding, infertility and pregnancy complications.

The most recognized challenge with the former name is the designation 'Polycystic', which does not indicate true pathological cysts at all, but rather arrested fluid-filled egg follicles. This misnomer creates confusion among patients and clinicians alike. Furthermore, the term PCOS focuses solely on fertility, thus obscuring the diverse cardiometabolic, endocrine, dermatologic, and psychological features of the condition. The metabolic impact can include long-term health issues such as obesity, fatty liver disease, type 2 diabetes,cardiovascular disease, and more. The inaccurate naming reinforces stigma, delays diagnosis and complicates epidemiological classification and policy alignment.

Despite being identified nearly a century ago, there is still no cure for PMOS. The renaming from PCOS to PMOS alone took 14 years of global effort, with the transition expected to occur over three years. Experts note that viewing the condition through a narrow gynaecological lens caused it to struggle for resources compared to other chronic metabolic conditions. The recent name change is expected to put greater emphasis on metabolic screening, facilitate earlier intervention and more holistic treatment plans. It could also help shape future research and treatment efforts.

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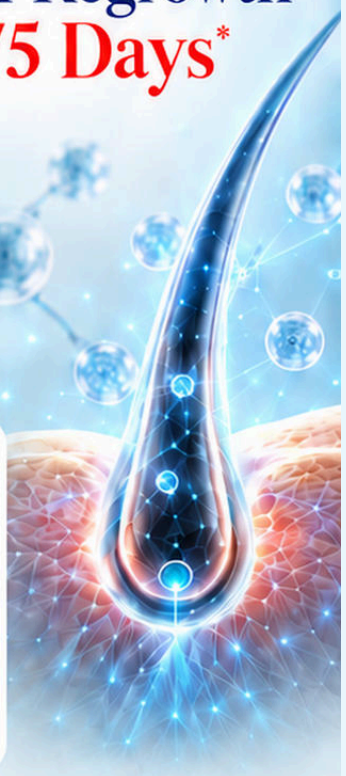

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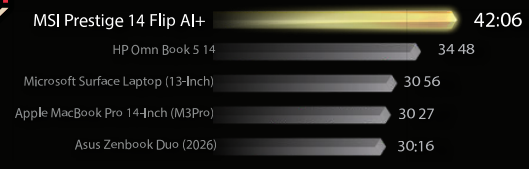


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# DO ETHICS AND INTEGRITY PLAY A ROLE IN PHARMACY?

Afrida Khan, 241

Imagine waking up to the lifeless body of your child, not knowing what had happened. This was the horrific reality of hundreds of mothers back in the 1900s in Bangladesh. Several manufacturers had decided to substitute propylene glycol with diethylene glycol, a cheaper toxic alternative, while formulating paracetamol syrups. This unethical decision to save cost had caused hundreds of children to die of acute renal failure and thousands to have renal complications. This was no mere ignorance; it was the greed of profit that had caused the disaster, ultimately breaking thousands of hearts and stealing the trust of millions from the pharmaceutical industry.

This begs the question, “What kind of people should work in the Pharmaceutical Industry to ensure safety?” Our first instinct is to think of hardworking, skilled, and knowledgeable people. However, there is one character trait that is often neglected yet just as important. It is integrity, a trait that allows a person to follow ethical guidelines. Unfortunately, ethics is one of those words people often throw around without properly understanding its meaning. Ethics not only means to follow the law; it also means to uphold morals, principles, and standards with honesty and responsibility even when no one is watching. Professionals must be willing to take accountability if anything goes amiss. As a pharmaceutical professional, possessing exceptional technical knowledge is not enough; being an ethical person should be one’s priority.

Pharmaceutical companies have a responsibility to communicate clearly and transparently regarding their pharmaceutical products. There should be no concealment or manipulation of the clinical trial data, as well as the active and inactive ingredients present in it must be disclosed. Marketing should be done based on scientific evidence rather than exaggerations of effectiveness or minimizations of adverse effects. Pharmaceutical professionals carry the responsibility of human health; whether one works in formulation, manufacturing, quality assurance, quality control, regulatory affairs, research, marketing, or dispensing, their actions will impact the lives of thousands or even millions. Therefore, every step from drug discovery to dispensing needs to be done with integrity, following an ethical code of conduct that should never be considered optional.

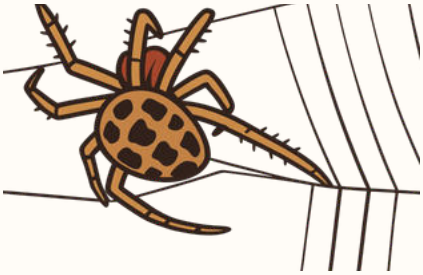
Ultimately, I would like to say that the Oath of a Pharmacist should be etched into one's mind and soul in a way that they never forget this lifelong commitment to serve humanity. This pledge can only be fulfilled if ethics remain at the centre of all decisions.

Student Article

# RECOMBINANT SPIDROIN

Junayed Ahad, 241

Nature has always been an ever-evolving source of biomaterials in the field of medicine. For instance, from marine sponges to deep-sea microbes, from cave bacteria to Antarctic microbes and camelid-derived antibodies to snail-derived venom, nature has provided the foundation for many FDA-approved drugs and continues to inspire promising results for the future drugs. Today let's talk about one of the strongest natural materials on Earth, a remarkable natural fiber - spider silk —that could heal the human body. Spider silk proteins contain highly repetitive sequences that give them unique and diverse material properties. Nanofibers from recombinant spider silk have broad potential for tissue engineering scaffolds, drug delivery carriers, sutures, and other biomaterials.



So, the question may emerge out of all biomaterials why spider silk? Well, research has shown that spider silk has spidroin proteins containing β-sheet crystalline regions which provide strength and glycine rich amorphous region which is responsible for elasticity. Unlike brittle synthetic materials it is more suitable for tissues that constantly experience movement.

As it has protein structure it is highly biodegradable and biocompatible and also early studies of nerve regeneration showed spider silk fibers remained well tolerated while supporting nerve growth. Spidroin proteins also have great possibilities in the field of drug delivery system, as smart carriers. As spider breeding is limited due to cannibalistic and territorial nature, recombinant spidroins are produced by inserting the spidroin (MaSp1 and MaSp2) gene into other host organisms for mass production. These proteins are ideal for drug delivery as they have amino acids enabling self-assembly. During pH, ionic strength, temperature or solvent composition change, the protein reorganizes into β-sheet-rich structures, forming a stable structure of nanoparticles, hydrogels or other biomaterials. Preclinical studies demonstrated in advance drug delivery of different anticancer drugs such as doxorubicin, cisplatin, paclitaxel loaded silk nano particles and binding silk proteins with tumor-targeting peptides (such as RGD motifs or HER2-binding peptides), and the results were comparable or in some models better than conventional systems. Higher efficiency for naturally accumulating in tumors through the Enhanced Permeability and Retention (EPR) effect. Encapsulation efficiency often exceeds 90% for some doxorubicin loaded spider silk and several other drugs. Besides, pH-responsive drug release, tunable and sustained release has been possible and thus giving lesser toxicity and higher specificity. Spider silk is not just nature's strongest fiber anymore; it has become one of medicine's most versatile biomaterial.

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# WHAT IF YOUR MEDICINE COULD PROGRAM YOUR CELLS!

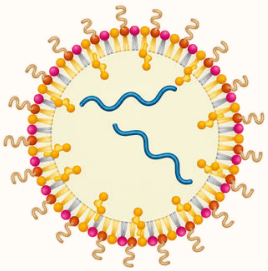
Minhajul Islam, 241

Picture a medicine that doesn't just land on a receptor or block an enzyme, but actually hands your cells a set of instructions and lets them do the work. That's the basic idea behind mRNA therapeutics and now it is quietly reshaping how researchers think about drug design.

Generally, we know that mRNA is a temporary carrier. Using genetic instructions it builds up protein and deliver it to ribosomes(the cell's protein-making machinery). Once the process is done, it breaks down and disappears. No permanent changes in the DNA unlike gene editing. mRNA is transient in nature.

Getting that fragile molecule into the cells intact used to be the hard part. The breakthrough came with lipid nanoparticles or LNPs, tiny fatty spheres that wrap around mRNA and diffuses it safely across the cell membrane. This isn't just a lab curiosity anymore. Moderna's mRNA-1273 COVID-19 vaccine built on exactly this LNPmRNA platform and showed 94.1% efficacy against symptomatic infection in a Phase 3 trial of over 30,000 people [New England Journal of Medicine].

Initially, vaccines were discovered. Scientists are now exploring whether mRNA can prepare the body to produce its own therapeutic proteins, train the immune system to hunt down cancer cells and also support a whole range of other treatment strategies. If a cell can be instructed to manufacture the right protein on demand, treatment could become far more targeted and adaptable than anything a traditional pill or injection offers.



LNP-mRNA

That being said, this isn't a solved problem. Getting mRNA to the right organ and keeping it stable, figuring out how often patients would need doses, managing unwanted immune reactions and controlling exactly how much protein gets made are still open questions researchers are in search of. Programmable medicine is exciting, but it's not magic.

Still, there's something genuinely fascinating about the shift underway here. Rather than engineering a molecule to act on the body directly. Scientists are increasingly engineering the instructions, letting the body build the molecule by itself. Maybe the future of medicine isn't about handing cells a drug. Maybe it's about teaching them how to make their own.

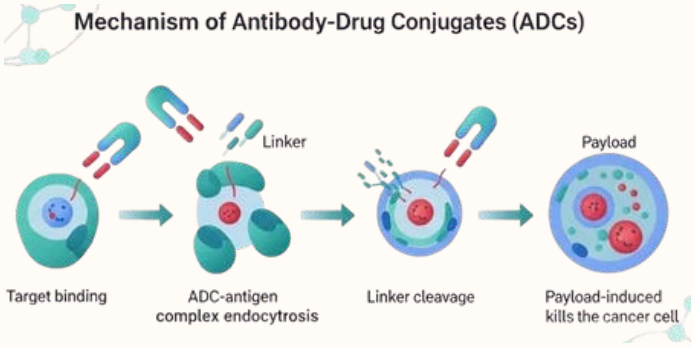
Student Article

# ADCS: TREATING CANCER WITH PRECISION AND SUSTAINABILITY

Ahmed Ibrahim, 242

Within contemporary cancer therapy, one of the most efficient platforms of targeted therapy is the antibody-drug conjugates (ADCs). Commonly referred to as biological guided missiles, ADCs consist of the specificity of monoclonal antibodies combined with the cytotoxicity of small molecule drugs delivered to the target by the linkers connecting both components.

The key feature of ADCs in terms of clinical practice is the targeted approach to the delivery of a drug. The standard systemic chemotherapy does not differentiate between healthy and malignant cells and therefore affects all the rapidly growing cells equally, causing such serious side effects as bone marrow depression, strain on various organs and immunity system. At the same time, the ADC moves through the bloodstream in an inactive state and activates only after binding with a certain antigen overexpressed on tumor cells.




Upon the activation, the tumor cells internalize the complex and the cytotoxic agent is released into the cell itself. Such an approach allows using chemotherapeutics which could not be applied systemically because of their high toxicity. The drugs against the markers such as HER2, TROP2, CD30 have revolutionized the therapy of breast, lung, and blood cancer.

Even though the clinical delivery mechanism exhibits precision, the production processes related to ADCs have a large carbon footprint. The fabrication process involves a complex blend of biotechnology and synthetic organic chemistry to create these unique drug molecules.

With 15 FDA-approved ADCs on the market including Kadcyla, Enhertu, Padcev, and Trodelvy, commercialization of such targeted drugs has taken off rapidly in hematology cancers and solid tumors. In view of this increase in access worldwide, the pressing responsibility for companies is to ramp up production sustainably while keeping their environmental impact low.

In order to ensure the sustainability of ADCs, biopharmaceutical companies are using various innovations within green chemistry and sustainable bioprocessing. For example, synthetic processes have embraced continuous flow synthesis and sustainable enzymatic coupling to lower the amount of organic solvents used in the coupling process. Also, modern production facilities have incorporated water recycling and energy-efficient air conditioning in clean rooms, in addition to high productivity expression systems, in order to lower energy consumption.

# ANTHROBOTS: HUMAN BIOBOTS THAT STITCH YOU UP

Rumman Tabassum Huda, 242

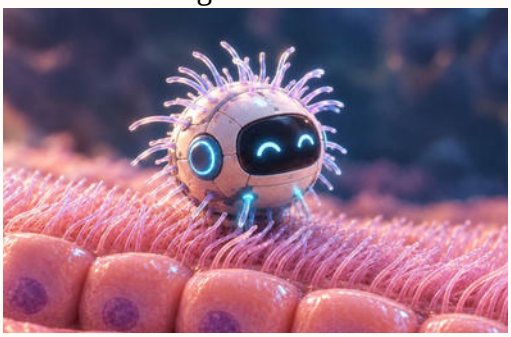
Student Article

My first introduction to a robot happened in the form of the famous Disney movie, “Wall-E”, and for the longest time, I associated the word “robot” to be synonymous to the cute animated character. 17 years later, my definition of robots has evolved, and my recent introduction to anthrobots has left me in awe of what simple human cells can do.

Derived from adult human lung epithelium, anthrobots are multicellular, self-constructing fully mobile structures. Their novelty lies in the fact that they do not require external aid during formation - they can self-organize. So they grow completely independent of genetic editing, manual sculpting, or embryonic tissue. Their motility comes from the cilia that project outwards into their external environment.

The ciliated spheroids are formed using a combination of established and newer techniques. Normal human bronchial epithelial (NHBE) cells are first cultured into regular spheroids, with ciliated lumen, in a gel-based matrix. This is followed by dissolution after 2 weeks, and then they are cultured in a low-adhesive matrix which causes the cilia to project outwards.

Ordinarily, cilia-in spheroids form owing to how basal cells interact with high-viscosity environments. So, by switching to a matrix with lower viscosity, the basal cells move inwards, while cilia covers the surface. Thus, the process becomes spontaneous simply by tweaking the matrix to be less viscous. Thus, anthrobots are said to be self-constructing.



The anthrobots were thoroughly observed by researchers at Tufts University and it was discovered that they could be categorized by movements: circular, linear, curvilinear and “eclectic” which shows intermediate movements. What stumped the researchers was the ability of these biobots to make biological repairs in damaged neuronal tissue. It was observed that anthrobots can easily traverse damaged tissue.

One other unique characteristic of these biobots is that they can join to form “superbots”. These were used to bridge gaps between two scratches, mimicking a stitch, and significant tissue regrowth was noticed within 72 hours. The regrowth between the scratches occurred only at the spots where the superbots had been placed.

These fascinating robots deserve in-depth exploration. They could be used to repair damaged tissue, sourced from patients themselves, which will circumvent potential immune rejections. They could also prove to be monumental for advancing precision medicine. In future, if scientists could harness these to clear arterial plaque or excess mucus in patients with cystic fibrosis, we could very well end up calling them real-life Wall-Es!

# THE OZEMPIC OBSESSION

Sarah A. Zubayer, 242

Ozempic, widely recognized as a breakthrough anti-obesity medication, has become synonymous with dramatic weight loss, particularly famous among celebrities. Semaglutide, the active ingredient present in Ozempic, is responsible for weight-loss effects. Semaglutide is a GLP-1 agonist that acts on reward and appetite centres in the brain. This drug mimics a hormone known as GLP-1, which stimulates the pancreas to increase insulin production, thereby reducing blood sugar levels. Ozempic lowers appetite by reducing the rewarding experience of eating and craving food. Ozempic was originally developed as a treatment for type-2 diabetes. In the last couple of years, Ozempic has been promoted across social media platforms, leading to its rising off-label uses, pushing the drug into a spotlight far beyond its original intent.

Doctors and experts are raising awareness about the risks these medications pose to patients. The side effects span from muscle loss, dehydration, and fatigue to severe complications such as pancreatitis, kidney and gallbladder issues. Anti Obesity Medications (AOM) like Ozempic are often misused by youngsters suffering from eating disorders or body image issues. Based on data from the U.S. National Survey on Drug Use and Health, according to a 2025 analysis, an estimated 28,691 people in the United States had injected Ozempic without a prescription in 2024.

The incorrect use of Ozempic can cause detrimental consequences to a user, both mentally and physically, leading to malnutrition and harmful weight loss. Due to the unrealistic beauty standards set by society and social media, a drug originally intended for diabetes and severe obesity started to become a quick fix for people suffering from weight gain. In addition, expensive drugs like Ozempic are more accessible to wealthier populations than lower socioeconomic groups. Moreover, the high cost and demand of these medications could lead to a substantial increase in healthcare expenditures, straining public health budgets and shifting the focus away from other vital services. Despite its potential risks, Ozempic also offers significant benefits, including weight loss, improved metabolic health, and reductions in obesity-related diseases such as type 2 diabetes and heart disease. As a society, it is imperative to raise awareness about the misuse of weight-loss drugs and shed light on preventative measures like a healthy diet and physical activity for the long run. We must start educating younger generations to develop healthy relationships with food and their bodies instead of turning to unnecessary pharmacological solutions.

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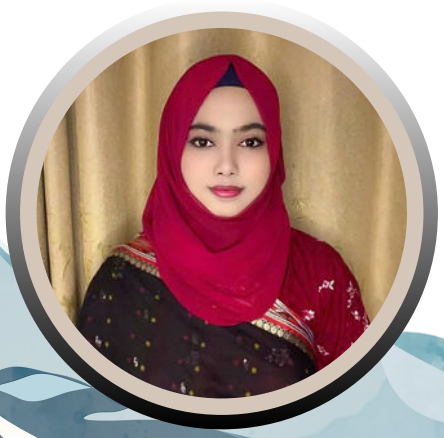
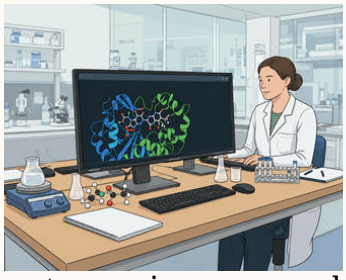


# DRUGGEN-2: DISEASE-AWARE AI

Fateha Arowah, 242

Conventional generative AI models for drug discovery ordinarily condition molecular generation on a single protein target or general molecular properties. They fail to consider specific disease contexts, which creates problems because a single target can behave differently or need a different pathway context across different diseases. For instance, PPAR gamma (peroxisome proliferator-activated receptor gamma) yields metabolic benefits in diabetes but divergent outcomes in colon cancer. To address this, the researchers brought in DrugGen-2, which is an extension of the DrugGen framework.



It is a disease-aware generative model that conditions small molecule design on both disease ontology and a target protein amino acid sequence. It gives high quality SMILES (Simplified Molecular Input Line Entry System) strings tailored for disease specific therapeutics. It is built by fine tuning DrugGPT (a pretrained GPT-2 model specialized for ligand generation).

For that the base model is trained for 6 epochs on a curated dataset mapping approved drugs, their targets, and their associated disease contexts. Then, a reinforcement learning (RL) framework is used to refine the model over 10 epochs. Group Relative Policy Optimization (GRPO) computes advantages using group level statistics which makes it more memory and computation-efficient than conventional actor-critic RL.

Here, RL phase uses three specific reward functions which include Binding affinity (predicts protein ligand binding using PLAPT) , Novelty ( Binary check against approved drugs to encourage new scaffolds) , Diversity (penalizes batch duplicates to prevent reward hacking).

The model was tested against 5 key protein targets linked to Diabetic Nephropathy (DN): ACE ( angiotensin converting enzyme ) , PPAR gamma , NOS3 (nitric oxide synthase) , PAI-1 (plasminogen activator inhibitor-1), TGF-beta1 (Transforming growth factor beta-1). It can generate 409-444 unique molecules per target (out of 500), significantly outperforming baseline models like DrugGPT (219) and DrugGen (50). It also achieved near-perfect structural and chemical validity (99%-100% median values via RDKit pipeline across all targets) and superior predicted binding affinities. Can maintain high structural similarity to existing approved drugs (median Tanimoto score of .70 on Morgan Fingerprints).

To confirm the biological relevance of the generated molecules, molecular docking simulations were conducted against crystal structures of ACE and PPAR gamma using Schrödinger's GLIDE extra precision. By embedding disease-specific context directly into molecular design, DrugGen-2 advances AI-driven drug discovery. This context-aware approach enhances both de novo compound generation and drug repurposing by capturing the intricate interactions between biological targets and disease pathways.

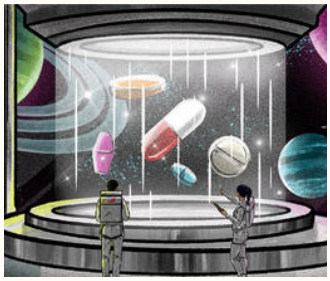
Student Article

# MEDICINE AMIDST INTERSTELLAR SPACE

**Raida Rownak Nusaiba, 242**

Most of us during our childhood dreamt of becoming astronauts to explore extraterrestrial mysteries. But have you ever contemplated how it feels to be living away from Earth, where basic chores, even taking your medicine, becomes extraordinarily difficult?

Spacecraft orbit the Earth at optimal speed that keeps them in a constant state of freefall, creating the sensation of microgravity. During space odysseys, microgravity influences astronauts' physiological systems in various ways, which sheds light on 'Bioastronautics,' the study of medical and biological changes in celestial space. Primarily, throughout the early phase of spaceflight, astronauts sense motion sickness, headache, congestion, and edema. The otolith organs, derived from gravitational cues, consequently trigger spatial disorientation, eye-hand coordination, and optic-disc swelling. Over time, the reduced mechanical stress on the skeletal system results in bone decalcification along with muscular atrophy. As a countermove, astronauts require 2 hours of cardio and resistive exercises daily. Fluid-shift towards the upper body includes changes in cardiovascular deconditioning, reduced plasma volume and RBC mass, altered electrolyte levels, and hormonal regulation. Furthermore, alterations in immune cell functioning, cell-cycle, cell-growth, genetic expression are also expected.



Astronauts take more than 100 different types of medicine for space ventures, which chiefly include painkillers, decongestants, tranquilizers, antiemetics, eugeroics, topicals, and injectables. Physiological adaptations respond differently to the medications than they do on earth; therefore, space-pharmacology is a major issue for extended space missions.

The harsh extraterrestrial environment encompasses cosmic radiation, microgravity, excessive launch vibration, humidity variation and temperature fluctuation that can easily impact the physicochemical stability of drugs, leading to loss of efficacy and toxic byproduct production. Nonetheless, countermeasures are taken to conquer the challenges, for instance, replenishing medications by frequent supply, storage in cryogenic temperatures, and application of radiation-resistant polymer in packaging. Moreover, scientists are focusing on specialized space pills and dose-shield packaging for future prospects. Additionally, precision medicine is progressing through organ-on-chip and nano-implantable technologies, while 3D-printed medicines allow the production of medicines locally to minimize the need to carry the abundant supply of medicines into space. Astropharmacy stands as vital as designing high-tech spacecraft when mankind prepares itself for cosmic exploration. It not only guarantees the health of human beings in space but also opens doors for medical breakthroughs beyond Earth.

# Farhana Chaity

Owner and Founder of Makeover Finesse by Farhana Chaity
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Diploma in hairstyling from Hair Zone by Michael Poh Kuala Lumpur, Malaysia.

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Makeup partner for Coke Studio Bangla - season 2, ICE Today, COLOR, Astro TV Malaysia, FEMININE Malaysia, Noksha etc.

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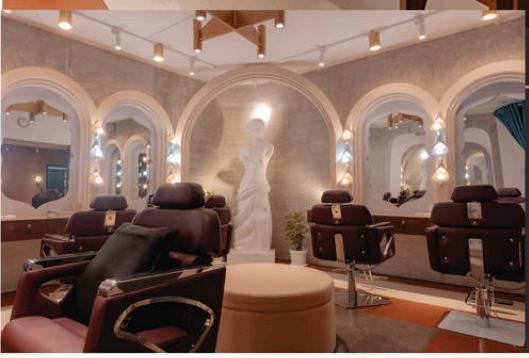

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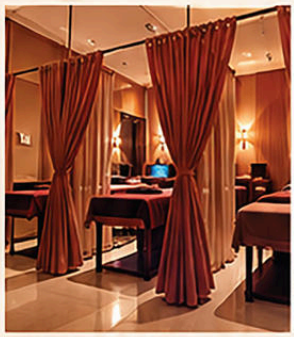

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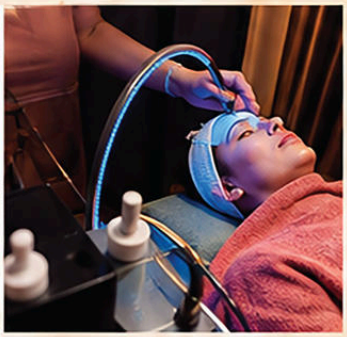

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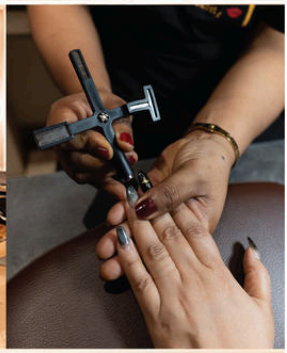

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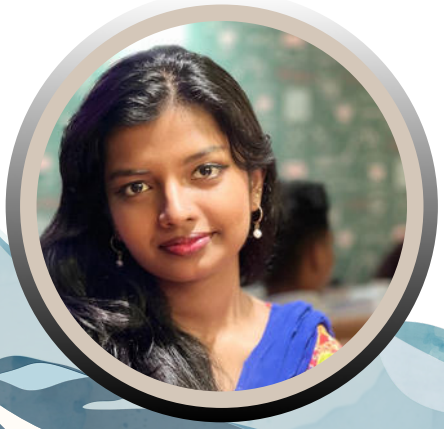


# LEAD CONTAMINATION

Amrita Zaman , 252

Student Article

When we think of health issues in Bangladesh, lead isn't typically the first thing that comes to one's mind. However, lead contamination is a serious public health concern in Bangladesh. Lead has serious detrimental effects on the mental health of an individual which in turn has severe social implications. The neurological effects of lead affect behaviour.Lead exposure may affect the pre-frontal cortex which is important for judgement and self-control. Similarly, in a developing hippocampus, presence of lead may cause problems with learning and memory. Lead exposure can lead to microgliosis and astrogliosis; this in turn may cause neuroinflammation . Lead can disturb the brain's defences against oxidants. This may damage neurones, thereby affecting emotional and cognitive control. Exposure to lead early on in life can alter gene expression, thereby causing long-term effects on behaviour.

According to UNICEF, Bangladesh ranks 4th globally in the number of children affected by lead poisoning. In the capital Dhaka itself, a 2022-2024 study found that 98% of the 2-4 year olds had lead levels that required urgent public health action. There are many diverse sources of lead in Bangladesh. Firstly, Unregulated lead-acid battery recycling : lead-acid batteries used by cars and 'battery rickshaws' are burned in small, unregulated workshops to recover lead. Lead pollutes air, soil and water of these recycling hubs. Secondly, Adulterated and contaminated food : the deliberate adulteration of commercial turmeric powder using lead chromate (yellow pigment) makes it appear more appealing to customers. Lastly, Contaminated household products: lead is present in large amounts in everyday household products. 54% of commercial wall paints available in the market exceed reference levels, whereas 59% of the samples of metallic cookware (especially aluminium pots and pans) exceed reference levels. Lead exposure during childhood may result in decreased IQ and reduced cognitive functions. Higher levels of lead in blood in children is linked to hyperactivity and aggression. Lead also interferes with brain development, leading to poorer executive function. These exact mechanisms also affect an individual's mental health; there is a heightened possibility for emotional dysregulation, anxiety and other mental health disorders.

The problem manifests into a cycle which goes on to affect the next generation and so on. The inability to regulate one's emotions leads to greater bouts of aggression and violence, which contributes to crime and unlawful activities.Thus, lead pollution affects not just the exposed individual, but the whole nation.A multi-faceted approach is needed to tackle the problem of lead pollution to curb both short-term and long-term effects.

# DIET SODA: FAT LOSS OR TRAP?

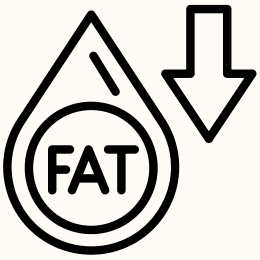
**Nazia Shamim, 252**

"One Rice bowl with Chicken Sizzling, One Chicken Mushroom Chowmein, and one Bangkok Fried Chicken anything else, ma'am?" the waiter asked.

"And one Diet Coke, please", my sister answered.

My mom immediately shook her head. "No, what's the point of drinking those diet sodas? If you want to control your weight, just avoid soft drinks altogether."

Sitting at the table as a second-year pharmacy student, I couldn't help but listen in. My sister viewed Diet Coke as a guilt-free shortcut for calorie control. My mom saw it as chemical-filled junk that was better left on the shelf. It made me wonder: from a pharmacological and metabolic standpoint, who was actually right?



The truth lies in a grey area known as harm reduction. Diet Sodas are not a metabolic miracle that burns fat, but they are not purely toxic either.

A standard can of a regular Coke contains 39 grams of added sugar-nearly 10 full teaspoons-delivering around 140 calories and a sharp glucose spike. Diet soft drinks swap that sugar for non-nutritive sweeteners, mainly aspartame. Because aspartame is 200 times sweeter than table sugar, manufacturers only need a tiny drop to match the sweetness of sugar. Because the amount used is so small, its total calorie value is effectively zero.

If my sister replaces two regular sodas a day with diet sodas, she cuts 300 calories daily only if she doesn't eat extra food to make up for those lost calories.

However, zero calories does not mean zero biological activity. When sweet receptors on your tongue taste something sweet, your body anticipates incoming carbohydrates. This is known as the Cephalic Phase Insulin Response. Over time, this sweet taste without real calories can increase sweet cravings and appetite. Furthermore, in 2023, the WHO released guidelines advising against using non-sugar sweeteners for long-term weight control due to the potential risks of Type 2 diabetes and cardiovascular issues.

For a healthier middle ground, functional options like green tea, hibiscus tea, or peppermint tea provide flavour and bioactive antioxidants without artificial additives.

Ultimately, both my mom and sister have a point. My sister is right about short-term harm reduction, as diet soda avoids a massive amount of sugar. My mom is right about long-term health, as artificial sweeteners maintain sweet cravings.

Next time my sister orders a Diet Coke, I won't call it toxic- but I might just pass her a cold-brewed iced hibiscus tea instead.

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# DÉJÀ VU: A MYSTERY INSIDE THE HUMAN BRAIN

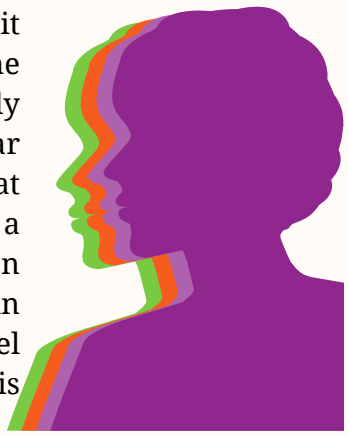
Md. Samiul Islam , 261

Student Article

Have you ever visited a place for the first time but suddenly felt that you had been there before? Or perhaps you were having a conversation that seemed strangely familiar, even though you knew it was happening for the first time. This unusual feeling is known as déjà vu, a French term meaning “already seen.”

Déjà vu is a strange feeling that makes us think we have already experienced a moment, even though it is happening for the first time. For many years, scientists and philosophers have tried to understand why this happens. Today, researchers believe that déjà vu is a normal phenomenon related to the way our brain processes memories and new experiences. Scientists suggest that certain parts of the brain, especially the temporal lobe and the hippocampus, play a vital role in creating this feeling. Sometimes, the brain may accidentally identify a new situation as something familiar. As a result, we feel as if we have seen or experienced the same event before.

Déjà vu was introduced in 1876 by French philosopher Émile Boirac. Before scientific research began, many people believed it was connected to supernatural powers, past lives, or even the ability to predict the future. Scientists believe déjà vu is closely related to the way our brain processes memories. One popular explanation is the memory mismatch theory, which suggests that the brain may accidentally recognize a new experience as a familiar one. Research suggests that déjà vu is more common among teenagers and young adults. It may occur more often in people who are under stress, do not get enough sleep, travel frequently, or have active imaginations. In most cases, it is completely harmless and disappears within a few seconds.



It’s a common experience that many people have at least once in their lifetime. It is believed to occur when the brain briefly processes a new situation as if it were a memory. Although the exact cause is still not fully understood, researchers think it may be linked to the way the brain stores and retrieves information. For most individuals, déjà vu is short-lived and not a cause for concern.

Déjà vu reminds us how remarkable and complex the human brain truly is. Researchers believe it is linked to memory and brain activity, and in some cases, certain medications may influence its occurrence. Although science has uncovered many clues, the exact cause remains unknown, keeping déjà vu an enduring mystery of the human brain.

# THE LIVING DRUGS THAT WALKED A BOY OUT OF A WHEELCHAIR

Sumaia Masud, 261

It was a fine morning in November 2020 when 17-year-old Drew was diagnosed with DIPG (Diffuse Midline Glioma) during his junior year of high school.

This highly aggressive, grade IV tumor grows directly into the brainstem. For this disease, radiation therapy offers only temporary relief, and no effective chemotherapy drugs exist. Because their malignant cells intermingle with healthy cells in key neurologic structures, the tumors cannot be surgically removedleaving Drew counting down his final days (9 to 12 months) according to the clinical progression timeline. But a miracle happened.

The boy who was paralyzed just 2 years prior walked by himself to the graduation stage of the American School in 2022.

What was the miraculous power that snatched Drew from the clutches of death and disability? His savior was none other than the reprogrammed "living cells" of his own body, called CAR-T (Chimeric Antigen Receptor T-cell). Drew was enrolled in a groundbreaking Phase I clinical trial at Stanford Medicine for this CAR-T therapy.

For this treatment, "soldier" cells (disease-fighting T-cells) are collected from Drew's body. Through genetic engineering, a new gene is spliced into their DNA, creating a special navigation or GPS system called CAR on their surface. This GPS is designed to recognize the GD2 protein found on cancer cells. After multiplying them by the billions in the lab, these "super soldier" cells are reinfused back into Drew's bloodstream via an IV.

Once back in the bloodstream, the real battle starts. The engineered receptor locks onto the cancer cell like a key into a padlock. The moment they lock in, the CAR-T cell injects toxic proteins directly into the cancer cells, popping them like balloons.

As the CAR T-cells completed their mission, successive MRIs showed his tumor shrinking dramatically. By May 2022, nineteen months after a terminal diagnosis, Drew's tumor was completely gone. He walked across the stage unassisted at his graduation to a tearful standing ovation—a living testament to cellular reprogramming. Drew's spectacular recovery is a rare success. Often, the cancer hides its GD2 protein, causing a relapse. However, Drew proved CAR T-cells can wipe out deadly brain tumors, inspiring the next logical step: 2026's breakthrough Multi-Target CAR T-cell therapy targeting WT1, PRAME, and Survivin simultaneously. This triple-lens approach protects future patients from the disguise-changing tricks single-target therapies fail to beat. Drew paved the way with a single lens, allowing modern medicine to build the ultimate multi-target system!

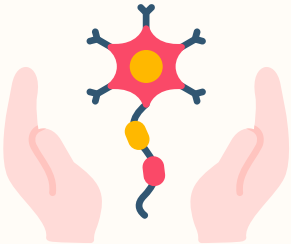
# MIMICKING NATURE'S TOUCH: PEPTIDIC KEYS TO NEUROPROTECTION

M M Shanjid Islam, M.Pharm 252

Student Article

Neurotrophins are a class of endogenous soluble proteins, crucial for neuronal growth, maintenance, survival, and synaptic plasticity. Four different neurotrophins have been identified in mammals: nerve growth factor (NGF), brain-derived neurotrophic factor (BDNF), neurotrophin 3 (NT-3), and neurotrophin 4/5 (NT-4/5). They exert their action by binding to tropomyosin-related kinase receptors (TrkA, TrkB, and TrkC) and p75 neurotrophin receptor (p75-NTR), leading to the activation of three major signaling cascades: PI3K/Akt, MAPK/ERK, and PLC-γ.

Disrupted neurotrophin signaling is linked to several neurological and psychiatric disorders. However, natural neurotrophin therapies face limitations such as instability, poor delivery, low bioavailability, and adverse effects. To overcome these challenges, researchers are developing synthetic neurotrophin peptidomimetics that mimic their key structural and functional properties. These low molecular weight compounds are tunable and offer many advantages over native neurotrophins, including higher stability and bioavailability, longer half-life, enhanced biological efficacy, and reduced risk of adverse events (e.g., immunogenicity). Some major neurotrophin peptidomimetic compounds currently under investigation include: **ACD856**: a small molecule positive allosteric modulator of TrkA/B/C receptors that boosts BDNF and NGF signaling. It was recently approved for Phase II clinical trial as a treatment for Alzheimer's disease, but has proven efficacy against Parkinson's, stroke, and mood disorders as well. **GSB-106**: a BDNF dipeptide mimetic that selectively activates TrkB and is in advanced preclinical trials for its prominent neuroprotective effects against ischemia and neurodegenerative disorders. It is currently close to IND application stage in Russia. GK-2: a NGF mimetic and partial agonist of TrkA, designed to prevent hyperalgesia by activating the PI3K/Akt pathway without any strong activation of MAPK. It has shown to improve motor and cognitive functions in stroke, Alzheimer's, and Parkinson's disease models. 7,8-DHF: a plant-based flavonoid that acts as a TrkB agonist and mimics BDNF, is currently under extensive preclinical trial and showing promising therapeutic efficacy against Alzheimer's, Parkinson's, and Huntington's disease. BNN-20: a synthetic neurosteroid DHEA analogue that binds and activates TrkA, TrkB, and p75-NTR, has exhibited significant neuroprotective effects in animal models.



By harnessing the molecular precision of nature, neurotrophin peptidomimetics can serve as a versatile and personalized therapeutic approach, offering renewed hope for patients suffering from neurological and psychiatric disorders, and paving the way towards safer, more effective neuroprotective strategies that are inspired by nature's own blueprint.

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# What Percent Pharmacist Are You?

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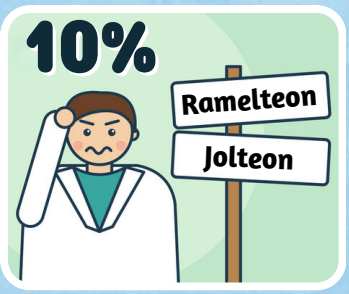
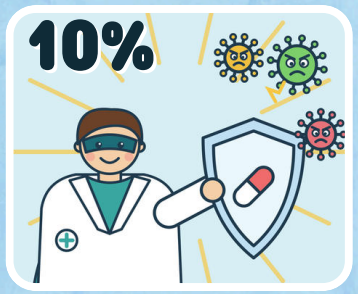
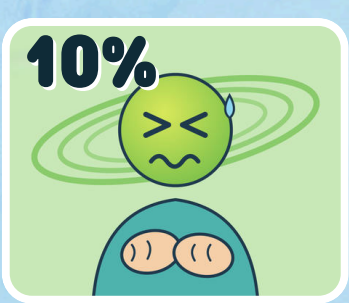


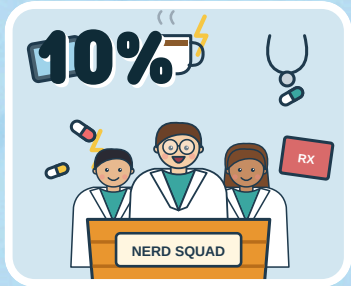

DRUG OR POKÉMON? HARD TO TELL




NEMESIS: ANTIBIOTIC ABUSE




NAUSEA & VOMITING: DEFAULT SIDE EFFECTS

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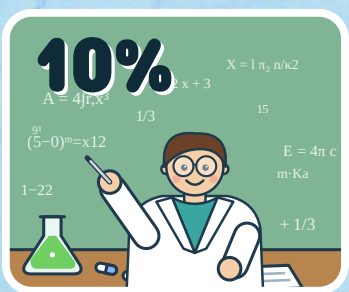
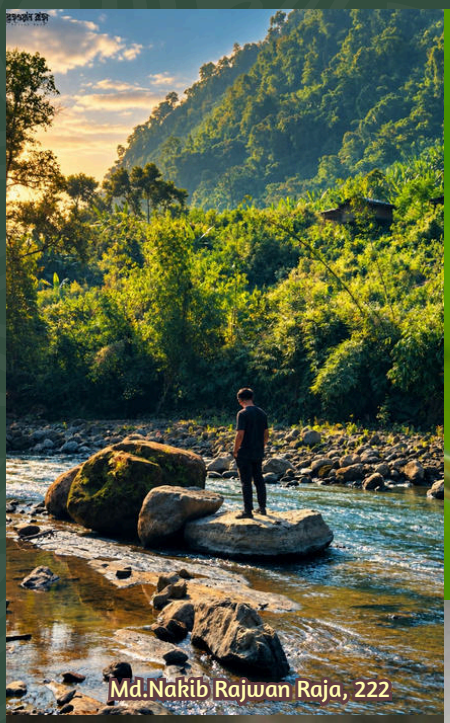
**40-60%: RETHINKING LIFE CHOICES**

**70-100%: PHARMACIST TO THE CORE**




FLED MATH, FOUND DOSAGE CALCULATIONS

# STUDENT PHOTOGRAPHY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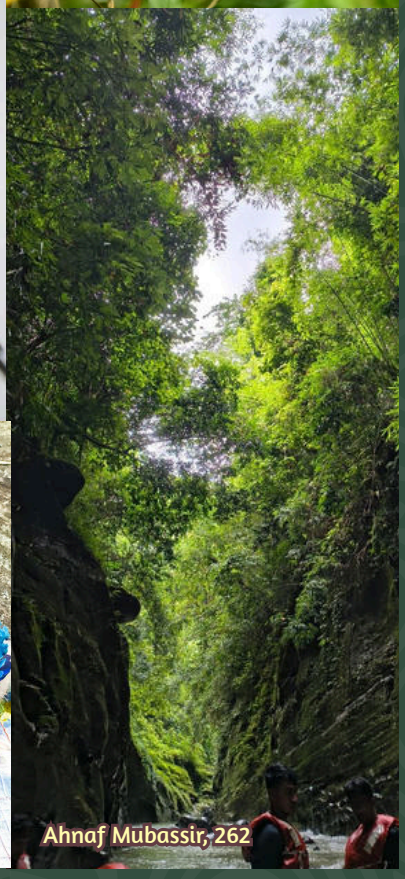
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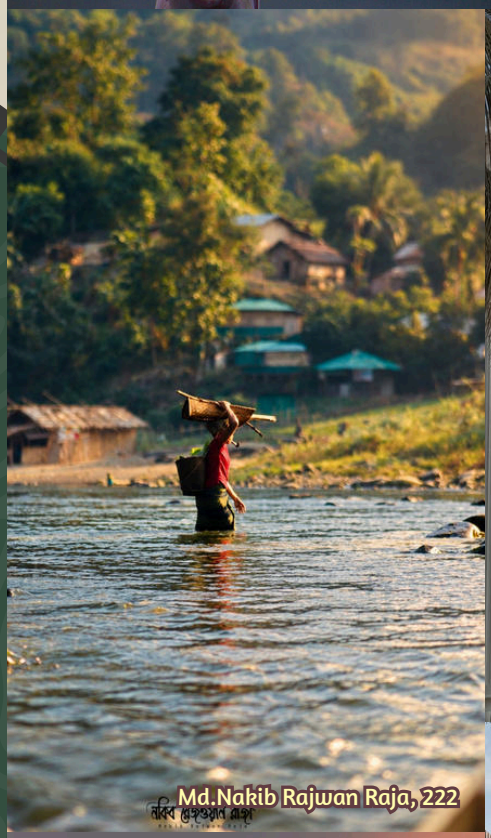
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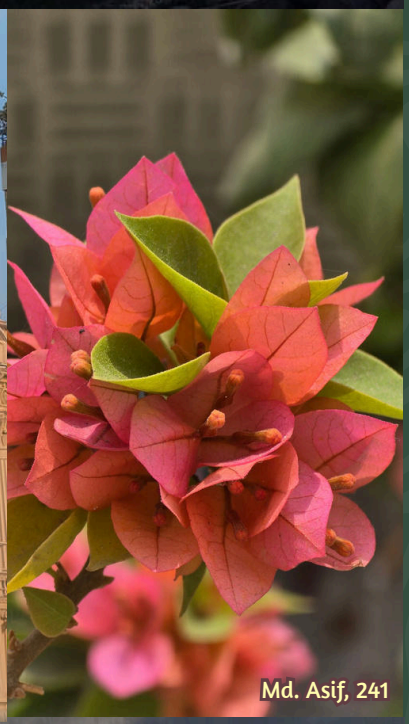
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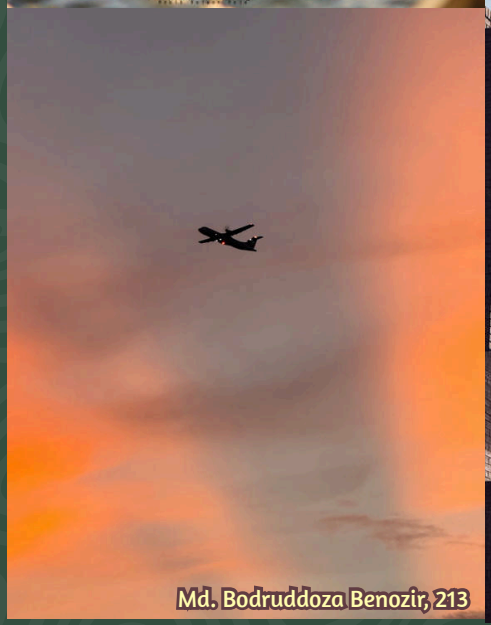
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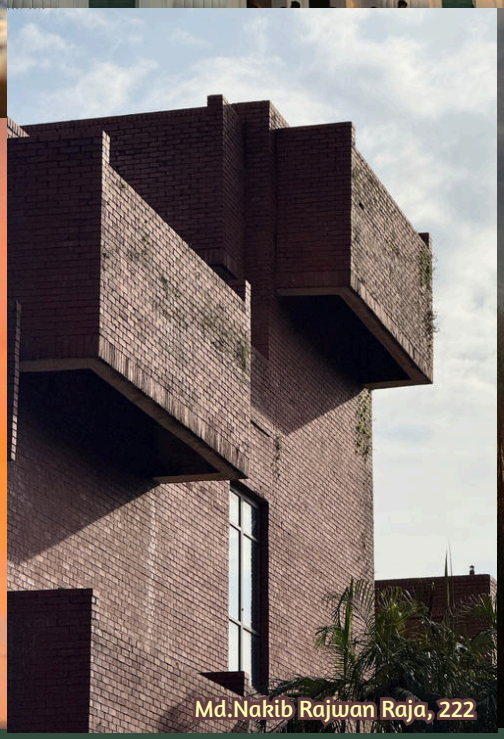
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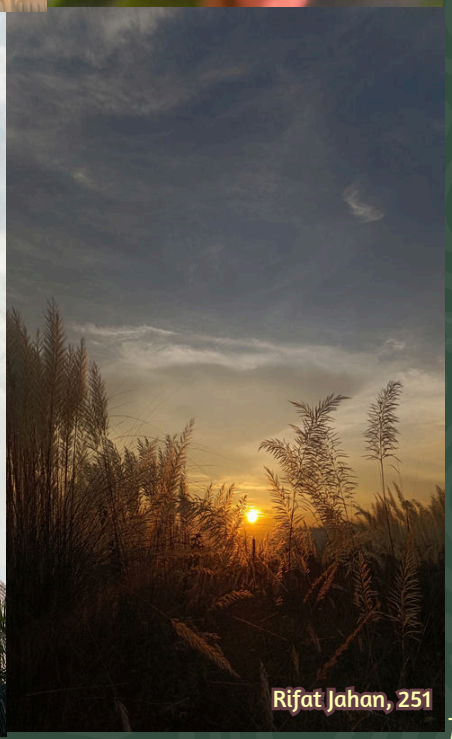
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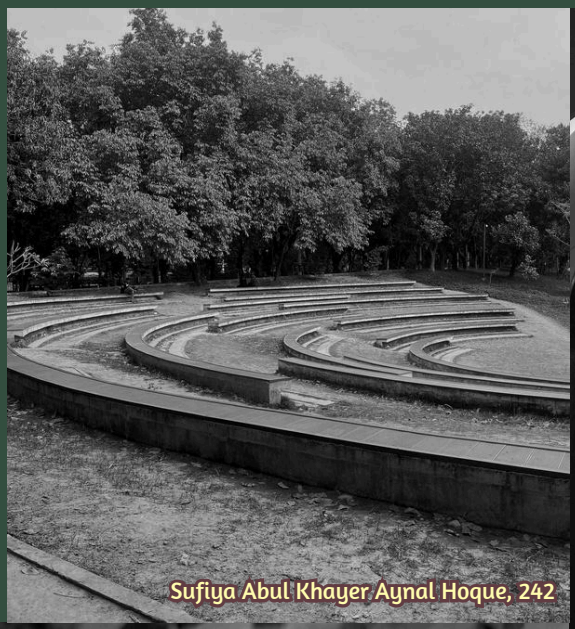

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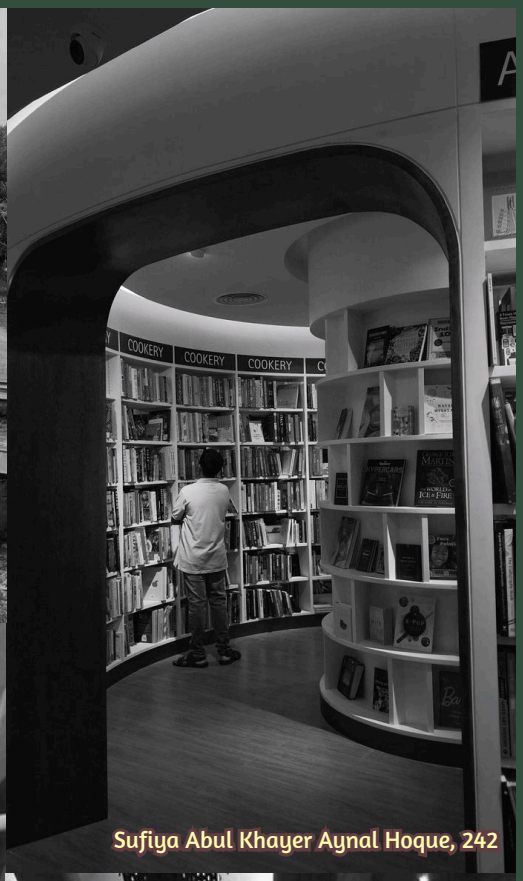


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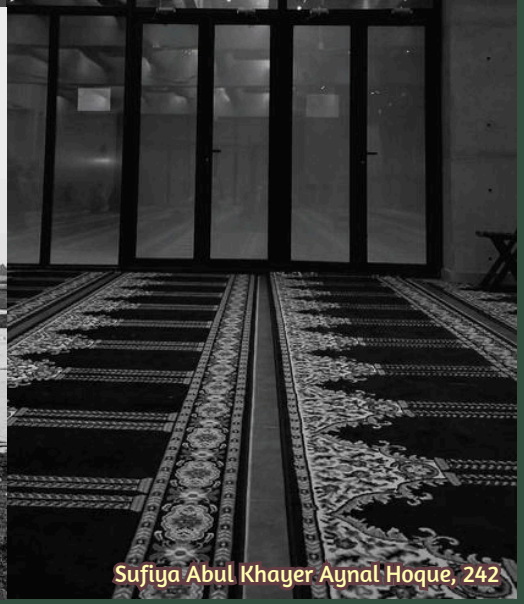

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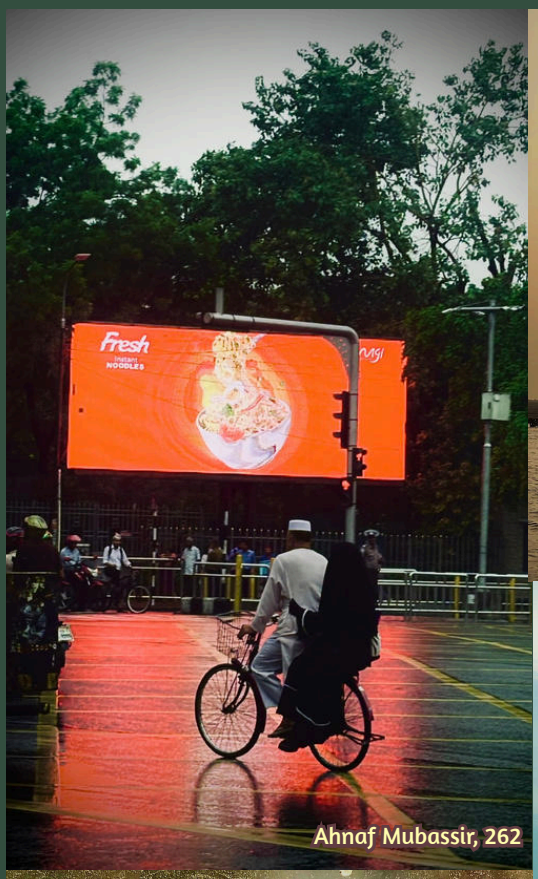

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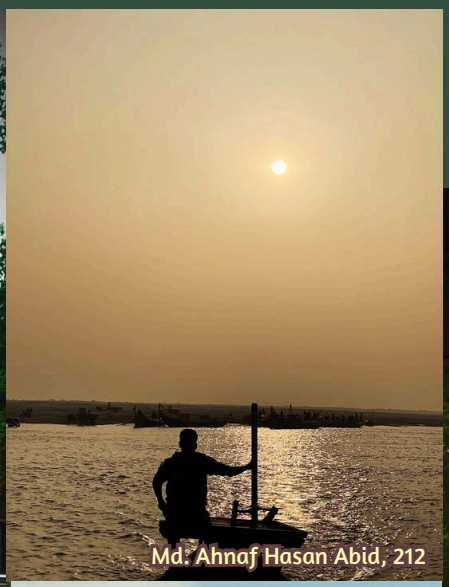
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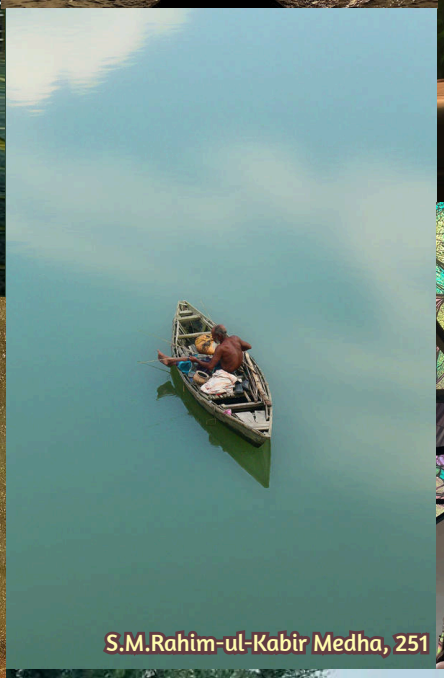
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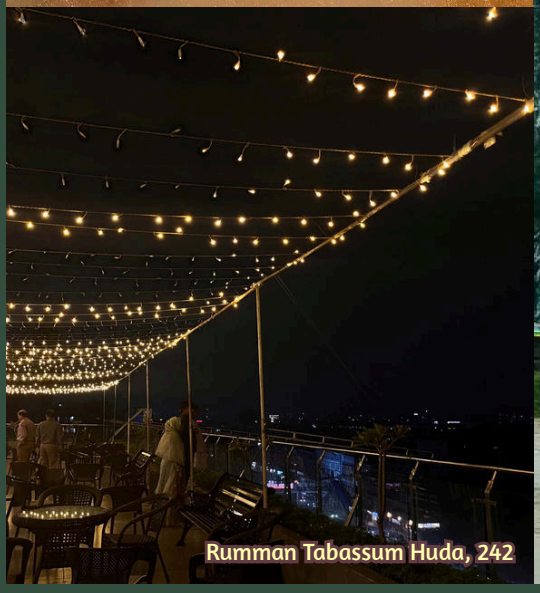
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# THE FIRST ELECTED AANSUP COMMITTEE BEGINS ITS WORK

At the end of June 2026, AANSUP held the election for its first elected Executive Committee. Every AANSUP member had the opportunity to vote, giving the incoming committee a direct mandate from the alumni community. While the formal handover was completed at the end of July, our active work began in August, focusing on activities that can offer clear value to students and alumni while building stronger links across generations, professions and countries.

## A COMMITTEE BRIDGING ACADEMIA AND INDUSTRY

The Executive Committee brings together alumni from both academia and industry. Its members understand the different paths open to Pharmacy graduates, from teaching and research to pharmaceutical production, quality, regulatory affairs, marketing and other professional roles. This balance is important because AANSUP should be able to connect academic ambition with the realities of professional life.

## ALUMNI NIGHT BEFORE PHARMA FEST

Our first major gathering will be the Alumni Night on the 11th of October 2026, held on the evening before Pharma Fest. As the Department of Pharmaceutical Sciences marks twenty years, we hope Alumni Night will bring together graduates from its earliest years as well as those who have only recently completed their studies. Every member of the NSU Pharmacy Family is warmly invited to join us on the 11th of October.

## HIGHER STUDIES MENTORSHIP PROGRAMME

Within the first two months of active work, we have launched the AANSUP Higher Studies Mentorship Programme. The response from alumni abroad has been extremely encouraging. A substantial group of mentors have already onboarded for the first cycle. The programme is designed as a three-month cycle in which each mentor supports a small group of two or three mentees through at least three meetings. The discussions will cover choosing a country and degree, preparing an academic CV and statement of purpose, approaching potential supervisors. Our plan is to run the programme twice each year and gradually develop an AANSUP Global Academic Alumni Database.

## CAREER AND INDUSTRY SUPPORT

We are also preparing to launch the AANSUP Career and Industry Wing. One of its core activities will be a CV Clinic which will allow students and graduates to receive focused feedback from alumni reviewers. Separate guidance will be developed for industry, academic, research, pharmaceutical marketing, and hospital or clinical CVs because one format does not suit every career path. Mock and live interview sessions are also planned. Candidates will be able to submit a CV and identify the type of role they are targeting before being interviewed by experienced alumni.

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ORGANIZATIONAL SECRETARY

ASIK MOHAMMAD SAYEED HOSSAIN
PUBLICATION SECRETARY

## A NEW DIGITAL HOME FOR AANSUP

On Alumni Night, we will also launch our official website at aansup.com. The website is being developed as a central place for membership information, events, mentorship, career opportunities, alumni news and ways to contribute. Over time, it should make it easier for alumni to stay connected, volunteer as mentors, share opportunities and find reliable information about AANSUP's work.

## AANSUP DEPENDS ON ITS ALUMNI

AANSUP is nothing without the support of its alumni. Work cannot be sustained without help. We need alumni to take part, share their experience, mentor students, circulate opportunities, attend events and tell us where AANSUP can do better.

The first months have shown how much can be achieved when alumni are willing to give their time and knowledge. We hope that support will continue to grow. Whether you are based in Bangladesh or abroad, working in academia or industry, newly graduated or well established in your career, there is a place for you in AANSUP. We look forward to welcoming you on Alumni Night and working with you in the years ahead.

***By the AANSUP Executive Committee***

# GOLDEN MEMORIES

## 20 Years of Department of Pharmaceutical Sciences

# CONTINUED

NORTH SOUTH UNIVERSITY

STALL EXHIBITION
POSTER PRESENTATION
PHARMAFEST17

Department of Pharmaceutical Sciences Presents

Platinum Events
EXCEPTIONAL EXPERIENCE EVERYTIME

Jiyon

Crowne Plaza

Aloki

Sena Malancha

Golf Garden

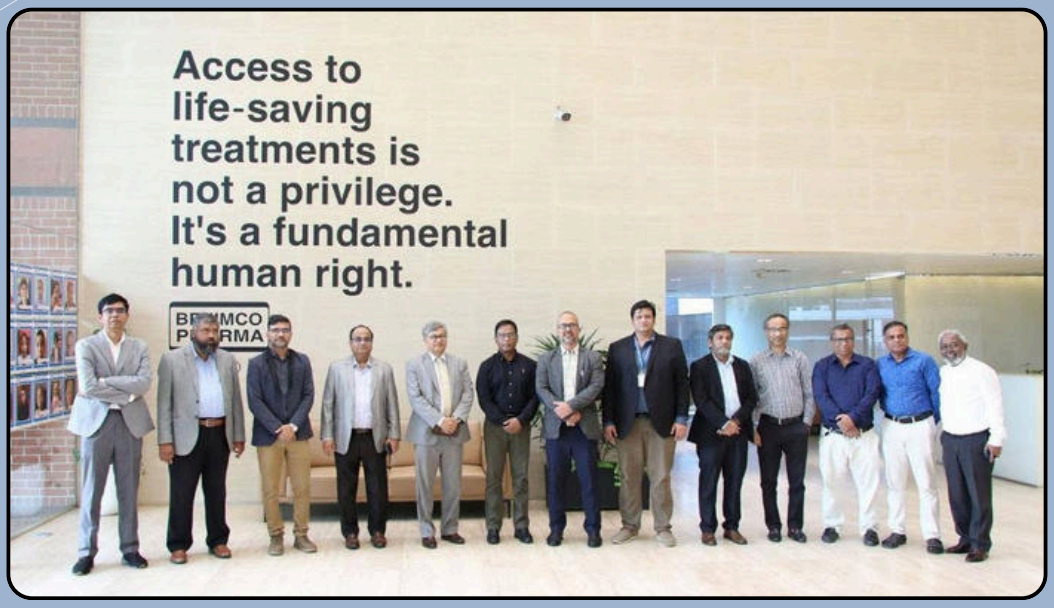
EST. 2025

# Kulfi Koi

AUTHENTIC KUSHTIA KULFI

# INDUSTRY-ACADEMIA COLLABORATION

Department of Pharmaceutical Sciences
NORTH SOUTH UNIVERSITY




Beximco Pharmaceuticals PLC and the Department of Pharmaceutical Sciences at North South University (NSU) have renewed their commitment to strengthening industry-academic collaboration to drive research, innovation, and career development. The partnership was formalized last year through a memorandum of understanding (MoU) to create opportunities for students to gain practical research experience and contribute to the growth of Bangladesh's pharmaceutical sector.

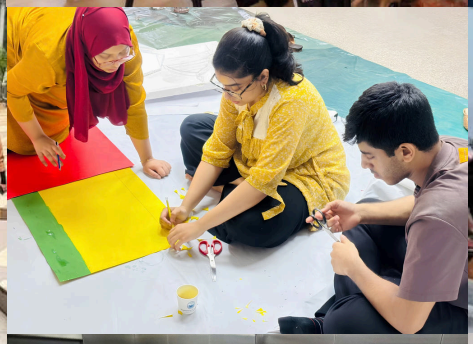
Steered by the leadership of NSU Vice-Chancellor Prof. Abdul Hannan Chowdhury and Dr. Mohammad Hossain Shariare, Chairman of the Department of Pharmaceutical Sciences, a meaningful step was taken when two M. Pharm students formally submitted their thesis projects at a ceremony held at Beximco Pharma's manufacturing facility in Tongi on September 3, 2026.

NSU Vice-Chancellor Prof. Abdul Hannan Chowdhury, Beximco Pharma COO Rabbur Reza, and a 10-member delegation of NSU faculty members attended the ceremony and toured the facility to inspect the company's manufacturing operations, quality standards, and production facilities. Within the collaborative framework, each party establishes distinct roles to ensure the initiative's success.

Through this joint venture, Beximco Pharmaceuticals PLC and North South University (NSU) merge industrial capability with academic rigor to advance pharmaceutical innovation in Bangladesh.

# FEST

# PREPARATION



# INDUSTRIAL BREAKTHROUGH!

1972-1982

STRONG DEPENDENCE ON IMPORTED MEDICINES.

THE MOMENT THE INDUSTRY CHANGED DIRECTION

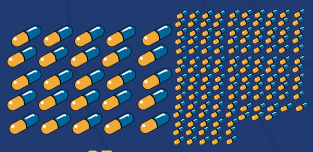
## 1982

DRUG CONTROL ORDINANCE

DRUG CONTROL

### DRUG MANUFACTURERS

8 MULTINATIONALS WITH **75% MARKET SHARE**



25 NATIONAL AND 133 SMALL(15%) **LOCAL**

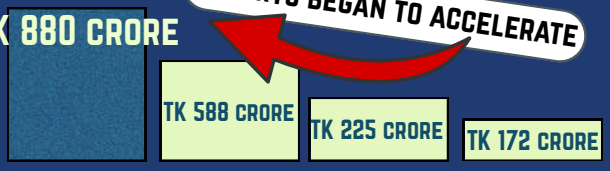
MULTINATIONAL MARKET SHARE

9% 2000

7% 2010

IN 1982, FOREIGN COMPANIES HELD 75% OF THE MARKET. BY 2010, THEY HELD 7%

EXPORTS BEGAN TO ACCELERATE




TOP 10 COMPANIES

- Square Pharmaceuticals PLC, Bangladesh (Since 1958)
- Incepta
- Beximco Pharma — here's to life
- Healthcare Pharmaceuticals Limited
- Renata PLC
- SK+F — Eskayef Pharmaceuticals Limited
- Aristopharma
- Opsonin Pharma — Ideas for healthcare
- Popular Pharmaceuticals Ltd
- Radiant Pharmaceuticals

## 2026

**US$238.5M**

PHARMACEUTICAL EXPORTS 2025-26

**213+**

ACTIVE PHARMACEUTICAL INDUSTRY

MADE IN BANGLADESH **98%**

OF DOMESTIC MEDICINE DEMAND MET LOCALLY

## A GLOBALIZING PHARMACEUTICAL INDUSTRY

**150+**

EXPORT DESTINATIONS

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MD. ADIT MUKTADIR PAVEL
EXECUTIVE COMMITTEE

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# STUDENT SUB-COMMITTEES

## MAGAZINE

## DEBATE

## OLYMPIAD

# STUDENT SUB-COMMITTEES

## STALL

## CONTENT

## INVITATIONS

# EXCHANGE PROGRAMS

## STEP BEYOND THE CLASSROOM AND EXPERIENCE PHARMACY FROM A GLOBAL PERSPECTIVE!

The North South University Pharmaceutical Sciences Exchange Programs give students the opportunity to experience international academic environments, explore new cultures, and develop valuable communication skills.

## RECENT PROGRAMS:

The students from North South University took part in the **EduCultural Research Fusion Exchange (EFEC) 2026**, which took place from July 30 to August 9 in Universiti Kebangsaan Malaysia. Led by Ms. Mahinoor Fairooz, the students participated in clinical simulations, hospital visits and team activities with students from other countries. It was designed to strengthen their knowledge, communication, and problem solving abilities. At the closing ceremony, they proudly shared their own culture and also celebrated the culture of others.

## FAQ?

**Where Can I Find Information About Exchange Programs?**
Program announcement posters usually contain all the requirements and application details. Keep an eye out for the latest opportunities on the NSU Office of External Affairs' Facebook page.

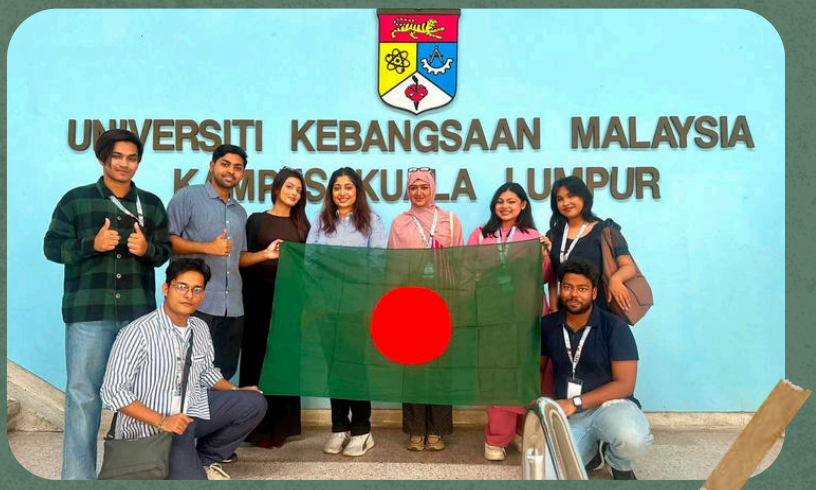
**Is There a CGPA Requirement?**
There is no fixed CGPA cap. Students apply and are selected through an interview process.

**Does CGPA Matter?**
A higher CGPA can be beneficial, but communication skills, especially fluent English, is an important consideration in the selection process.

**How Much Does an Exchange Program Cost?**
Costs vary depending on the country, program, and timing. Major expenses include program fees, accommodation, food, and airfare.

**What Is Usually the Biggest Expense?**
Airfare can be one of the largest costs. For Malaysia, consider round-trip flights to Kuala Lumpur; for Japan, additional transportation such as bullet trains may also be required.

**Do I Still Have to Pay My Semester Fees?**
Yes. Semester fees and exchange program fees are separate, as these programs usually last only a few weeks.



# EXPERIENCES

**Niigata University Summer Medical Exchange 2026** was held in the scenic Niigata Prefecture in Japan, from 22–31 July, 2026. The students joined hospital tours, advanced laboratory training, while working alongside peers of different countries, under the guidance of respected doctors and professors.

The **UM short-term outbound exchange program** offered a remarkable opportunity to learn at the research-intensive Universiti Malaya in Kuala Lumpur. Students got hands-on lab experience working with 3D-Printing and microneedles under the supervision of Dr. Md Jasim Uddin.

**International Pharmacy Immersion Programme (IPIP) 2026** at UniKL RCMP, Malaysia took place from 13–27 September 2026 in Ipoh, Perak, under the guidance of Ms. Sadia Shabnam.

The **2026 CESI International Summer School** on "Smart Healthcare & AI" in France offered hands-on experience with cutting-edge medical technologies, AI, and digital health solutions.

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প্রতিদিনের হেলদি ব্রেকফাস্টে সাথে থাকুক
হানিরাজ এর ন্যাচারাল এবং অথেনটিক মধু।

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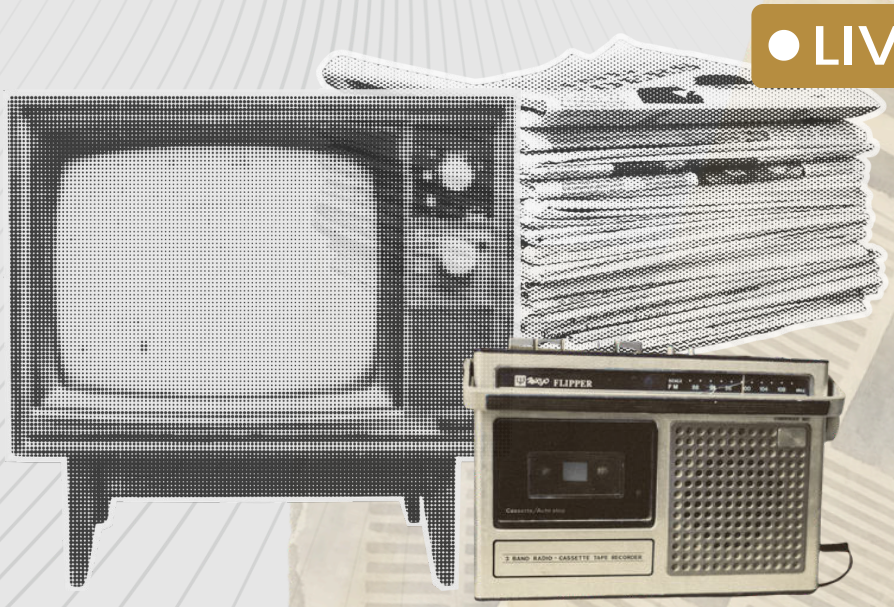

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