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2ND VOLUME

STUDENT'S CHRONICLES

An Official Magazine of Faculty of Health and Life Sciences

Mahayogi Gorakhnath University Gorakhpur

Arogyadham, Balapar Road, Sonbarsa, Gorakhpur-273007, UP , India

STUDENT'S CHRONICLES

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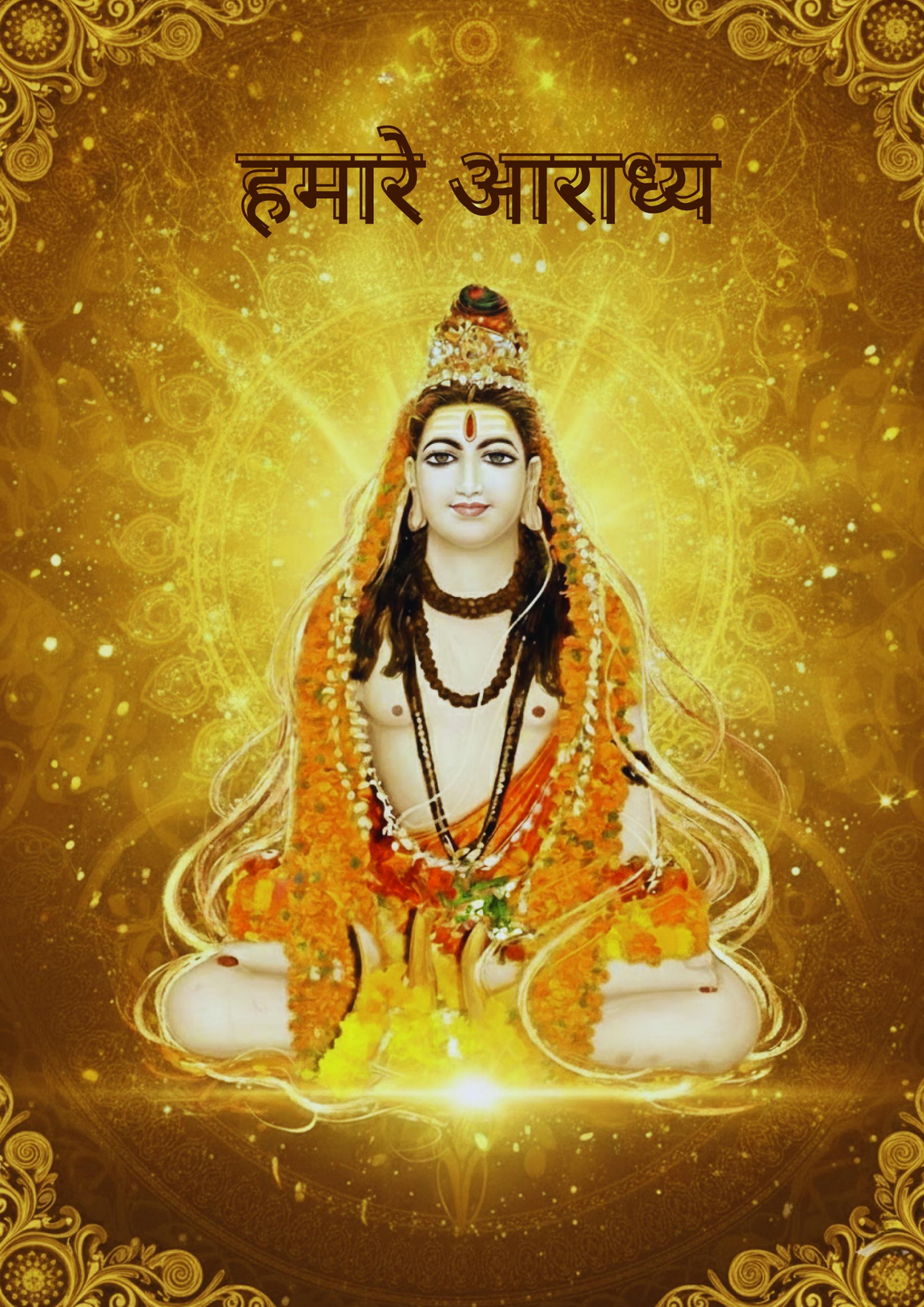

Our Inspiration

Inspirational Leadership

Shri Yogi Adityanath Ji Maharaj

Hon'ble Chief Minister, Goverment of Uttar Pradesh

&

Chancellor, Mahayogi Gorakhnath University

Gorakhpur

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Dean, Faculty of Health and Life Sciences.

Dr.Manish Kumar Tripathi
Principal, Maharana Pratap PG College,
Jungle Dhusan, Gkp.

Message from the Dean

It brings me great pride to witness the publication of the second volume of "Student's Chronicles: The Official Magazine of Faculty of Health and Life Sciences." Following the resounding success of our inaugural edition, this volume stands as a testament to the enduring spirit of inquiry and creativity that defines our student body.

The transition from a debut to a second volume is a significant milestone. It proves that our students are not only capable of innovation but also of consistency and excellence. In the ever-evolving landscape of health and life sciences, the ability to communicate complex ideas with clarity and passion is just as vital as the work done in our clinics and laboratories.

This edition continues to bridge the gap between academic rigour and personal expression. I am heartened to see a wider array of research insights, reflective essays, and artistic contributions, all reflecting the diverse talents of our students.

I extend my sincere appreciation to the editorial board and every student contributor for their unwavering commitment. May this second volume further ignite your intellectual curiosity and serve as a proud record of your journey here at Mahayogi Gorakhnath University Gorakhpur.

Wishing the team continued success and a bright future ahead.

Prof. Sunil Kumar Singh
Dean
Faculty of Health and Life Sciences
Mahayogi Gorakhnath University Gorakhpur

Message from Editor Desk

With immense joy and pride, we present the second volume of Student's Chronicles. What began as a spark of ideas is now flourishing into a vibrant publication. An evolving voice of the Faculty of Health and Life Sciences at **Mahayogi Gorakhnath University Gorakhpur.** This **February 2026** edition reflects not only the creativity of our students but also the collective spirit that continues to nurture and expand this vision into reality.

We extend our deepest gratitude goes to our Dean**, Professor, Sunil Kumar Singh** Sir, whose unwavering support, guidance and provision of essential resources made this publication possible. Your belief in the importance of a student-led medium gave us the confidence to take risks and strive for higher standards. Your guiding philosophy*: "Good design is obvious, great design is transparent. Education is not confined to classrooms; it extends to communication."* Remain a constant source of inspiration for our work and vision.

We owe our heartfelt thanks to our Mentor, **Dr Manish Kumar Tripathi** Sir, whose guidance shaped this journey. At every challenging stage, your insights helped us refine our work and your encouragement ensured that the project stayed on course.

Our sincere appreciation goes to the Editorial team for their tireless dedication. Your late nights, meticulous attention to detail and collaborative spirit transformed challenges into achievements. This magazine truly reflects of your hard work and commitment.

This issue is truly a labour of love, and we could not have accomplished it alone. We extend our gratitude to all the authors, researchers, and poets who contributed their time and expertise. We wish to especially acknowledge **Dr. Pawan Kumar Kanaujiya** for his invaluable insights and the depth his research brings to this volume. Your contributions provide the analytical balance and intellectual weight that enrich this magazine. By sharing your perspectives on innovation, health, and personal growth, you have offered our readers something truly meaningful to reflect upon.

Finally, to our readers: this magazine was created for you. We hope you will not just turn its pages, but immerse yourselves in the stories, research and creative expressions within. There is a wealth of knowledge to be gained from the diverse voices in this volume, and we encourage you to enjoy the journey and engage deeply with the ideas your peers have worked so hard to present.

Thank you for being part of Student's Chronicles.

The Editorial Team

Student's Chronicles: A Magazine of Faculty of Health and Life Sciences

Student's Chronicles Magazine is an initiative of the faculty of health and life sciences of Mahayogi Gorakhnath University Gorakhpur. It is a quarterly magazine that contains general/ scientific articles, poetry, stories, general awareness content, and social wellness-related content. The whole content of this magazine is supposed to be produced or developed by the student of the Faculty of Health and Life Sciences. The idea behind this initiative is to provide a platform for content development beyond the university curriculum for the student. Apart from this, students will also get knowledge of the publishing process of articles by getting hands-on with Microsoft Office and different tools of computer applications that play a key role during the publishing process. It will also develop a culture of teamwork and leadership quality among those who will work as part of the core team of this magazine.

Guidelines and rules for the contents of the magazine-

1. Every contribution to this magazine should be **original** and **self-created.**
2. Initially, the total number of pages in this magazine is 12, excluding editorial details, front, and back pages.
3. Only a single contribution is allowed for an individual.
4. The **800 maximum words** and **one image** are allowed in a single contribution.
5. Only self generated images are allowed to avoid copyright issues.
6. The final decision on contribution will be taken by the core editorial committee of this magazine.
7. In the core editorial committee of this magazine, there will be **six editors,** including 1 principal editor (reserved for post-graduation students), 1 editor (reserved for post-graduation students), and 4 co-editors (reserved for undergraduate students).
8. One faculty member will also work with the core committee for the students who were assigned by the Dean of the Faculty of Health and Life Sciences.
9. The language of contribution is either **Hindi or English or Sanskrit.**
10. The magazine's non-printable version is released in the **first week** of upcoming **quarter,** and students will send their contribution via email **(studentschronicle05@gmail.com)**by the **30th of every quarter.**
11. Magazine should have contribution from the following areas-
    a) General topics related to health and disease
    b) Value-added stories, prose, and poetry
    c) Indian culture and heritage
    d) General science and technology
    e) Any other topics relevant to geopolitics, humanity and nature

Note: Authors are responsible for their contents.

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असाध्य बेड़ियों को फान कर,
बैठा था जब मैं तूफ़ान पर।

निर्छलता से परे ममता से घिरे,
मातृत्व को हैरान कर।

मैं इस बड़े जनतंत्र का हिस्सा था,
पर न कोई पन्ने का किस्सा था।

मुझ पर उफान ले रही थी अनेक अलंकृतियाँ,
मातृत्व को हैरान कर रही थी अनेक अलंकृतियाँ।

मैं उस सड़े-गले विधान का यश्मदीद था,
पैरोकार के आँखों में ठीक-ठाक दीद था।

परन्तु मेरा हलपनामा माँगा न गया,
मुझे शिश्म की बेंत से साधा न गया।

ये भी उस विधान की दयनीयता या कोई संयोग था,
न मुझे समझ, और न कोई दोष था।
जो तब न हुआ उसका नतीजा ही कुछ और था।।

YOUNG MINDS IN FORENSIC SCIENCE

Palak Rai
B.Sc. Forensic Science, First Year

Bridging Science and Justice

In a world where truth is concealed beneath complex layers of evidence, forensic science acts as the bridge between mystery and justice. It is the field that reveals hidden truths, ensuring facts succeeds over falsehoods. In this era dominated by true-crime podcasts and documentaries, young people are increasingly interested in forensic science not just for the thrill of solving mysteries, but for the pursuit of justice. Today's generation of forensic enthusiasts is reshaping investigative methods. With advancements in artificial intelligence, data analytics, and biotechnology, students and young professionals are discovering new ways to gather evidence quickly and accurately. By utilizing 3D crime scene reconstruction, DNA profiling techniques, and digital forensics to track cybercrimes, they are transforming theoretical concepts into strong tools for justice. Educational institutions and research programs now encourage the integration of science and technology through collaborative projects and internships, enabling youth to tackle real forensic challenges. They blend computer science with chemistry, physics with psychology, and biology with cyber security.

THE ROLE OF FORENSIC SCIENCE IN BRIDGING SCIENCES AND JUSTICE

Forensic science plays a very important role in connecting the world of science with the system of justice. It uses scientific methods to carefully collect and examine evidence from crime scenes, which can include fingerprints, DNA, or other physical materials that help, reveal what really happened during a crime. After analyzing this evidence, forensic scientists provide accurate and reliable information that helps police and courts identify the guilty, clear innocent people, and understand the facts clearly. A crucial part of their role is expert testimony, where forensic scientists explain their findings in court.

They must present complex scientific information in simple language that judges and juries can understand so, those decisions are made based on solid proof rather than guesses or opinions.

This testimony is given under oath, and forensic experts may be questioned extensively by both the prosecution and defense lawyers to ensure their conclusions are accurate and trustworthy.
By exploring forensic science, young learners can see how science helps protect innocent people and hold the guilty accountable, making justice clearer and more reliable. This early exposure prepares them for future roles where they can use science to support fairness in society, helping bridge the gap between scientific knowledge and justice in ways that make a real difference.

The Ostrich Effect

Sakshi Pandey
B.Sc. Biochemistry, First Year

The Ostrich Effect is the profoundly human impulse to avoid information that we already know will make us uncomfortable, threatened, or weighed down emotionally. Somewhere in our psyche, we hope that if we don't confront the problem-if we don't acknowledge it, read about it, or confront it-maybe it will lose its hold on us. Maybe, just maybe, it will go away if we just pretend it's not there. Like the monster in the dark, we think it can't hurt us if we just don't look.

The Ostrich Effect gets its name from the common myth that ostriches bury their heads in the sand when threatened by predators. While this isn't something ostriches actually do, it's definitely something humans do in our minds. The Ostrich Effect is a function of emotional avoidance. When our brain knows that bad news is coming, our anxiety level goes through the roof. To immediately alleviate this discomfort, our brain goes into avoidance mode. It says, "Not now maybe later." And for a moment, it works. There's relief. There's calm. There's silence.
But this calm is only temporary.
With time, avoidance does not solve the problem but makes it stronger.

Unread messages, unanswered feedback, delayed decisions, and unresolved conflicts do not vanish but become heavier, becoming a source of constant stress in the background. What seemed manageable before now seems insurmountable, and this is exactly because it was not dealt with.

This psychological sand-burying is evident in our daily lives. We put off checking test results, avoid reading medical test results, sidestep tough conversations, or scroll past truths that contradict our beliefs.
Notably, this is not a character weakness but a psychological misfiring that tries to shield us from short-term pain. Our nervous system favors short-term comfort over long-term happiness, even if it costs us our clarity and control.
But how do we begin to stop hiding?

One strategy recommended by psychologists is exposure. Exposing ourselves to discomfort in small doses helps retrain our brains to be comfortable with uncertainty and fear. It is awareness, even when it hurts, that gives us back our power. Hiding may give us comfort for a moment, but truth gives us strength for a lifetime.

"Peace doesn't come from closing your eyes, but from opening them without any fear."

समय का मूल्य

नितिन यादव
बी.एससी. बायोकेमिस्ट्री, द्वितीय वर्ष

समय की धड़कनों में छुपा है जीवन का हर राज,
जो इसे समझ ले वही बनता है कल का ताज।

हम रोज कल पे टालते है सपनों की सुरुआत,
फिर शिकायत करते है क्यों नहीं मिली मनचाही सौगात।

समय न रुकता है न किसी के लिए मुड़ आता है,
जो इसे खो दे वो पछताने में उम्र गुज़ार जाता है।

छोटे-छोटे पल ही कल की बड़ी सफलता बनते हैं,
जो हर दिन को समझदारी से जीते हैं, वही आगे बढ़ते हैं।

समय एक शिक्षक है बिना बोले समझाता है,
जो इसका मोल जान ले, वही जीवन में जीत पता है।

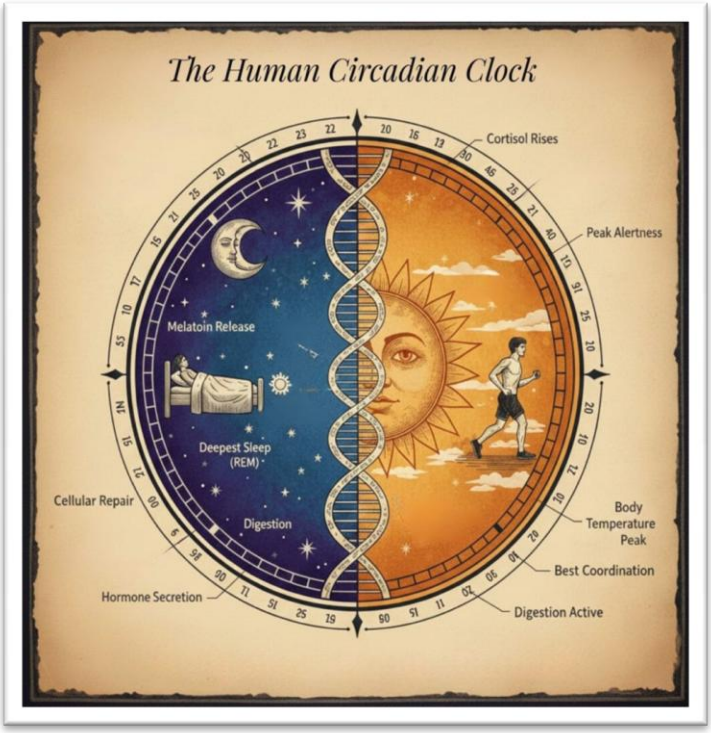
BORROWED TIME

Shreya Patel
B.Sc. Biochemistry, First Year

TRACING THE RHYTHM OF LIFE THAT BEGAN LONG BEFORE HUMANS EVER EXISTED.

Ever wondered why pulling an all-nighter feels like time itself is against you, or the mornings when you wake up before your alarm and wonder, how did my body know? Or the days when you are pretty well exhausted, but you still stare at the ceiling, wide awake. It feels random, isn't it? You must blame it on your ancient ancestors. You follow a rhythm that isn't yours at all; instead, it is borrowed from life that existed billions of years ago, when life first danced to the light of the sun.

Hidden deep in the brain, a small cluster of neurons called the superchiasmatic nucleus acts as our "master clock." Taking cues from sunlight, these neurons set the pace for nearly every system in the body from respiration and release of hormones to mood and temperature. Even our genes turn on and off like lights in the 24-hour cycle. These internal clocks keep running even when we try to outsmart them. It is very humbling; this same mechanism once guided ancient bacteria floating in primeval seas.
Your body's schedule isn't something you can simply reset its inherited time encoded into every cell.



Inside each of us, there is a clock that never stops ticking not the one on our wrists, but one carved into our DNA, keeping time with the universe. Long before us, or even plants, there were first single-celled organisms living in ancient oceans who had already figured out that sunlight meant survival (food and warmth), and darkness meant danger.

To keep up with this, they evolved a simple but extraordinary system they learned to anticipate the sun. They began to time their internal chemistry to match the planet's day and night cycle, the same timing system still ticks inside you and every living being today.

Our body still thinks it is living by the rise and fall of the sun, a cosmic habit it refuses to give up. Scientists say even a small piece of tissue kept alive in a lab continues to follow its own rhythm, as if remembering a sunrise it can't see anymore. So, the next time you fight sleep, or maybe drink a whole gallon of coffee to stay awake for an assignment, remind yourself that your body isn't being lazy; it is still listening to the same clock that guided microscopic ancestors through tides of light and darkness. It is just living through time and loyal to its oldest teacher the Earth.
We're all timekeepers, borrowing beats from the first flicker of life that ever learned to feel the sun.

Civic Sense

Aman Shah
B.Sc. Biochemistry, First Year

Civic Sense: The Foundation of Responsible Society

In the modern world marked by rapid progress in technology, education, and infrastructure one persistent challenge stand out the lack of civic sense.
Civic sense is the conscious practice of responsible citizenship showing respect for public spaces adhering to societal norms and considering the well being of others. It goes beyond obeying laws. It is an ethical mindset that recognizes how individual actions affect the entire community. Simple daily habits, such as proper waste disposal, disciplined driving or queuing patiently, reflect this sense.

Why civic sense matters?

A strong civic sense resolve many societal issues effortlessly, clean street, orderly traffic, safe public areas, and a cooperative environment would become commonplace. Unfortunately in many Indian cities, littering, unnecessary honking, traffic rule violations, and damage to public property are routine. These small acts accumulate into larger problems: environmental pollution, frequent accidents, clogged drains causing floods and increased stress.

In contrast nation like Singapore and Japan exemplify outstanding civic sense. Their public space remains impeccably clean, often without strict surveillance, due to a deeply ingrained culture of discipline and collective responsibility.

Core element of civic sense -

- Discipline: Voluntary adherence to rule.
- Sensitivity: Empathy towards other's need and safety.
- Respect: Treating shared resources with cars.

A meaningful citizen thinks, "Public spaces belong to everyone not just me."

Civic sense in action: Indian example

India has inspiring successes too The Swatch Bharat Mission, launched in 2014, has transformed sanitation by building millions of toilets and promoting cleanliness drives, significantly reducing open defecation through community involvement.
The orderly queues at Delhi Metro station show ho infrastructure and awareness together faster positive changes.

Building civic senses

Civic sense begins at home where children learn by observing parents and strengthens it in the schools through education, campaigns, and activities.
Media and social platforms can amplify these efforts.

Conclusion

Civic sense is the true marker of progress, real development lies in the responsible citizens not just grand structures. When individuals address small responsibilities, visions like a "Clean India" and "Safe India" become reality. Changes starts with us-embracing civic sense build a harmonious and progressive nation.

क़दर का सफ़र

अवन्तिका पासवान
एम.एससी. बायोटेक्नोलॉजी, प्रथम वर्ष

ज़िंदगी में अगर कोई कमी न होती,
तो किसी को किसी चीज़ की क़दर न होती।

गहराइयों के अंधेरे को देखा न होता,
तो ऊंचाइयों की रोशनी की क़दर न होती।

बार-बार नाकामी से मुलाकात न होती,
तो ज़िंदगी में कामयाबी की क़दर न होती।

जब होगी कामयाबी से मुलाकात,
तो पूरे दिल से गले लगाएंगे।

नाकामी ने जो-जो सितम ढाए हैं,
उसका फिर एक किस्सा अपनी कामयाबी को सुनाएंगे।

बस एक कदम और है बाकी,
इस बार तो किनारे पहुँच जाएंगे।

अगर न हुए पार इस बार भी, तो क्या हुआ?
फिर से ज़िंदगी को आज़माएंगे।

ART OF STILLNESS

Alpita Tripathi
B.Sc. Biochemistry, First Year

Stillness in a Fast-Moving Campus Life

College life today is defined by constant activity-lectures, deadlines, social media, and notifications that never seem to stop. In such an environment, stillness is often misunderstood as laziness or lack of ambition. Scientific research presents a different perspective. Stillness is a deliberate pause that allows the mind and body to recover, reflect, and function more effectively. Without these pauses, students are more likely to experience burnout, mental fatigue, and declining motivation.

Stillness is not stopping life; it is giving life the space to breathe.

What Science Says About the Brain and Stillness?

From a neurological standpoint, constant stimulation keeps the brain in a high-alert state. Over time, this reduces concentration, memory retention, and creativity. Periods of silence allow the brain to shift into relaxed patterns associated with deeper learning and problem-solving. Many students report clearer thinking and improved academic performance when they intentionally include moments of quiet in their routines.

The Body's Natural Reset Button

Stillness has powerful effects on physical health. When a person slows down, heart rate decreases, breathing becomes more regular, and stress hormone levels decline. This natural recovery process strengthens the immune system and reduces the long-term effects of chronic stress. For students managing irregular sleep schedules and academic pressure, stillness acts as a much-needed reset button.

Emotional Balance through Silence

College years often involve emotional challenges such as comparison, self-doubt, and uncertainty about the future. Stillness creates space to observe thoughts and emotions without judgment. Psychological studies suggest that quiet reflection reduces anxiety and improves emotional regulation. By pausing before reacting, students can respond to challenges with clarity rather than impulse.

Stillness teaches us to respond, not react.

Stillness in the Age of Digital Noise

Technology has intensified the struggle to remain still. Constant notifications, online comparisons, and digital multitasking fragment attention and increase stress. Choosing moments of silence-such as screen-free study sessions or quiet breaks-helps students regain focus and mental control. In this way, stillness becomes an act of self-discipline and mental protection.

Practical Ways Students Can Practice Stillness

Stillness does not require drastic lifestyle changes. Simple habits such as mindful breathing between classes, sitting quietly before starting assignments, journaling thoughts, or spending a few minutes in silence before sleep can significantly improve mental balance. When practiced consistently, these small moments of stillness accumulate into long-term benefits.

Conclusion: Relearning the Power of Pause

In a culture that glorifies busyness, choosing stillness is a powerful and intentional act. Scientific evidence confirms that silence supports mental clarity, emotional stability, and sustainable productivity. For college students striving for academic success and personal well-being, stillness is not a luxury-it is a necessity. Sometimes, the most meaningful progress begins with a pause.

THE BIRD EYE VIEW OF PCOS

Draksha Bano, Shagun Gupta, Arshita Maurya
B.Sc. Biotechnology, Third Year

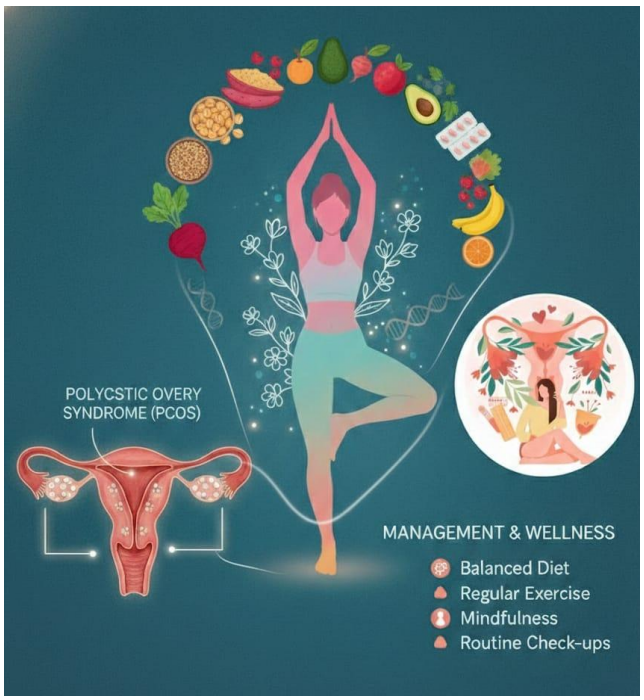
Polycystic Ovary Syndrome (PCOS), also known as Stein-Leventhal syndrome, is one of the most common endocrine and metabolic disorders affecting women of reproductive age worldwide. It is concerned with the ovary, which is an active organ that changes its form into a globular shape, oyster grey in color, with a smooth, glistening, tense surface and thickened pearly grey capsules. It is a complex hormonal condition that leads to irregular menstrual cycles, excessive androgen (male hormone) levels, and the development of multiple cysts on the ovaries, which contain many immature follicles that fail to release mature eggs. Menstrual irregularities and infertility occur in many cases.

In PCOS, this delicate hormonal balance is disturbed. The secretion of hormones from GnRH increases luteinizing hormone (LH) while follicle-stimulating hormone (FSH) decreases, leading to incomplete maturation of ovarian follicles. By this, the follicles stop growing and accumulate as small cysts within the ovary. Anti-Müllerian hormone (AMH) levels are also seen in PCOS, which further prevent the maturation of follicles and reduce the chances of ovulation.

It is caused by an imbalance in reproductive hormones, particularly an increase in androgen. Metabolic problems like diabetes, obesity, cardiovascular diseases, depression, and obstructive sleep apnea (OSA) are also associated with PCOS. If left untreated, it may lead to serious complications like infertility and endometrial cancer. Symptoms of PCOS include irregular or absent menstrual cycles, hirsutism, acne and oily skin, weight gain or difficulty losing weight, and difficulty in conceiving.

Doctors diagnose PCOS using a combination of clinical symptoms, blood tests, and ultrasound scans. Blood tests are performed to measure hormone levels, while an ultrasound helps to detect multiple cysts on the ovaries. The Rotterdam criteria are widely accepted, which state that a woman can be diagnosed with PCOS if at least two out of three features are present-irregular or absent ovulation, hyperandrogenism, and polycystic ovaries seen on ultrasound. Similar symptoms like thyroid disorder and prolactin level abnormalities are also evaluated. Blood sugar and cholesterol levels are often tested as well, because many women with PCOS suffer from insulin resistance or metabolic syndrome. Proper diagnosis helps in planning treatment and lifestyle management to control its symptoms.

PCOS has become a health concern for women today, largely due to modern lifestyle habits, poor diet, lack of physical activity, and disturbed sleep, leading to hormonal imbalance, insulin resistance, and weight gain. Therefore, adopting a balanced lifestyle is the most effective step toward managing this condition. A healthy diet rich in whole grains, fruits, vegetables, and proteins helps regulate blood sugar and hormone levels, while reducing the intake of refined sugar and processed foods can improve symptoms. Regular exercise, yoga, and stress-relieving activities play a vital role in hormonal balance. Although PCOS has no permanent cure, it can be controlled through lifestyle modification, medical treatment, and self-care. We must be concerned about PCOS because it not only affects fertility but also increases the risk of diabetes, heart disease, and stress in the long term. Awareness, early diagnosis, and preventive care are essential to protect women's health and empower them to lead balanced, confident, and fulfilling lives.



उठो और तरक्की करो

रोशनी सिंह
एम.एससी. बायोकेमिस्ट्री, प्रथम वर्ष

ये इन्सान, तू कर ले खुद की पहचान।
कभी न कभी कुछ बड़ा करेगा , कभी करेगा अनोखा।
आने-जाने के इस बंधन से, खुद को कर ले तू स्वतंत्र।

ये इन्सान, तू कर ले खुद की पहचान।
वरना इस चौरासी में, भटकते रहोगे तुम हर पल।
अपने तो जाओगे, संग पीढ़ी भी ले जाओगे।

ये इन्सान, तू कर ले खुद की पहचान।
यदि आया है तो जायेगा।
किया नहीं संघर्ष यदि तू, जीवन भर पछतायेगा।

जीवन की हर एक नयी सुबह, सफलता का एक नवीन मार्ग होगा।
जब हम सब एक साथ होंगे, तब राष्ट्र का निर्माण होगा।
ये इन्सान, तू कर ले खुद की पहचान।

Aptamer - Based Strategies for Therapeutic and Diagnostic Applications

Dr. Pawan Kumar Kannaujiya
Assistant Professor, Department of Biotechnology

What if we could design a 'molecular key' that fits perfectly into a cancer cell but ignores a healthy one and we could grow it in a test tube for a fraction of the cost of current drugs? Enter **Aptamers.**

Introduction

Aptamers are short single-stranded DNA/ RNA or synthetic XNA oligonucleotides molecule with high affinity and specificity capable to attached specific targets site. Aptamers library generated through technique known as SELEX (Systematic Evolution of Ligands by Exponential enrichment) to fold nucleic acid into unique three-dimensional structures that bind targets with high affinity dissociation constants (Kd) in the picomolar-to-nanomolar range. Aptamers have high specificity stems with shape complementary, rivaling antibodies, althoughpresenthigher chemical stability, low molecular weight (6-30 kDa), and post-SELEX modifications like PEGylation or fluorophore attachment. These attributes allow reversible binding, rapid dissociation, and non-immunogenic profiles, addressing antibody limitations such as aggregation and high production costs.

This article explores application of aptamers in therapeutics and diagnostics (Figure 1), focusing on molecular mechanisms, advantages over biologics, and barriers to clinical translation *via* enabling targeted modulation and sensitive detection.

Aptamers use in Therapeutic Applications

Aptamers revolutionize therapeutics with a accurate targeting rooted of mechanisms in multivalent binding and triggered release.

- **In Gene therapy** aptamers conjugated with siRNA/ miRNA/ CRISPR ribonucleoproteins use for receptor-specific delivery to compensate the altered genes and facilitate into the normal geneto restore the proper protein function.

- **Nanomedicine** administration for cancer treatment using aptamer-conjugated nanoparticles such as Mucin-1 aptamers on doxorubicin-loaded rods boost tumor accumulation with glutathione-triggered release yielding 80% payload efficiency and deep stromal penetration finding indicated anticancer effects.

- **Immunomedicine** Highly stable PD-L1 aptamers block adeimmuno checkpoint to enhance the antitumor activity and also induce adoptive NK cells immune response.

- **Aptamers in Diagnostic Applications** Aptamers play important role in early identification and determining the disease prognosis in pathogenicity to mitigate the additional risk during treatment.

- **Biosensors** due to their sensing mechanism, electrochemical aptamer-based biosensors provide swift method for detection of SARS-CoV-2 and possess potential significant in drug monitoring.

- **Imaging** it is possess of distinctive characteristics of aptamer arise as a powerful imagining benefit like SW1-aptamer exhibited high affinity recognition as non-nucleic acid element indicated that SW1is effectively identifying malignant liver tissue with high detection rates.

- **Biomarker** aptamer- probes are enabling to detect target biomarkers present in very low amount in blood serum assessment which are often not detected using antibody based applications. Aptamer-GFET (graphene field effect transistors) precisely sensing associated with neurodegenerative disorders like AD (Alzheimer's disease) and PD (Parkinson's disease).

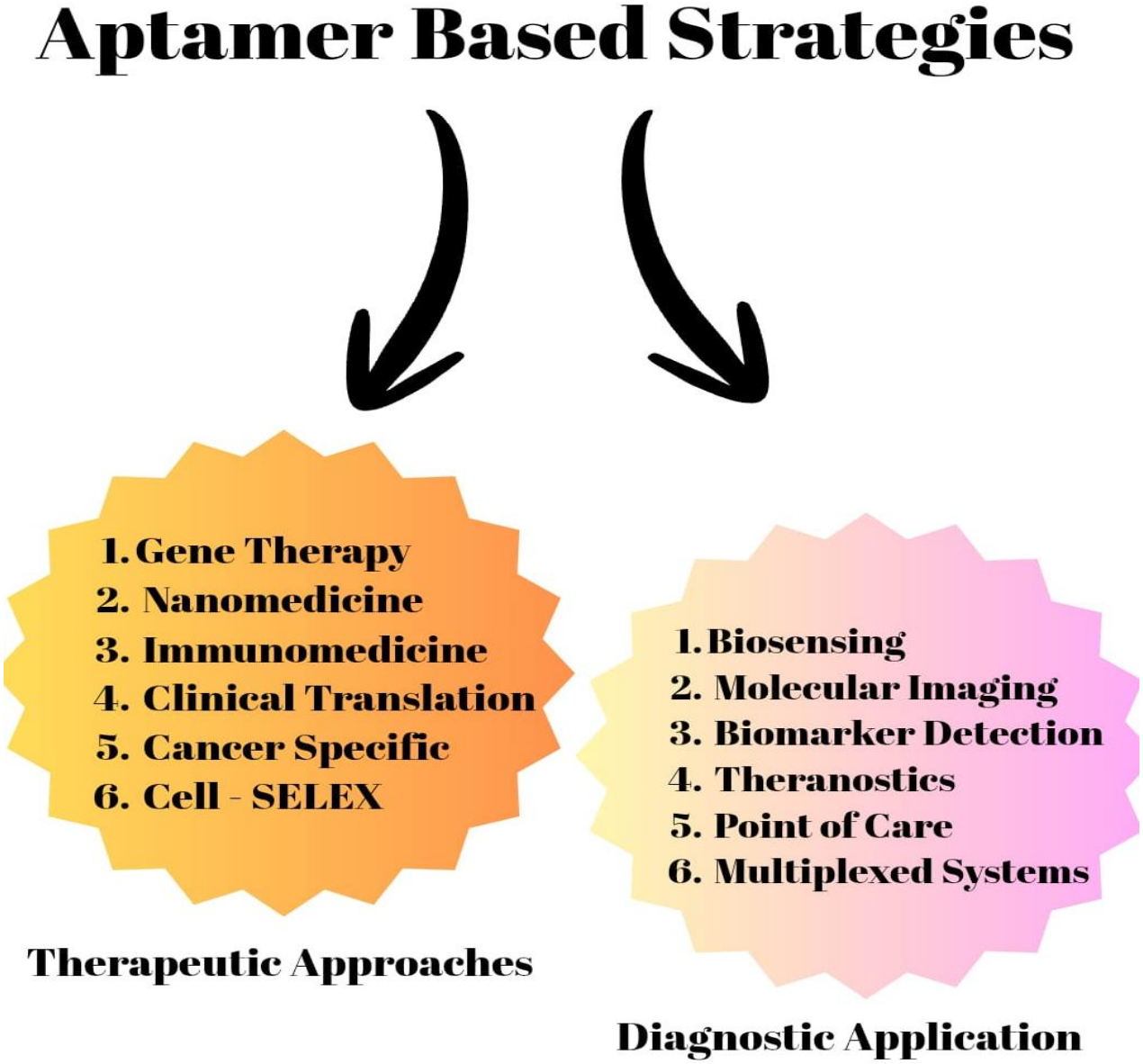


Figure 1.Aplications of aptamers utilized in several biomedical disciplines including biosensors, molecular imaging, drug delivery and gene therapy.

Point-of-care (POC)

- **Stability:** Unlike antibodies (Ab), which require a "cold chain" (4°C storage), aptamers remain stable at temperatures up to 40°C.
- **Accessibility:** Aptamer-based test strips for SARS-CoV-2 or glucose monitoring are cost-effective to produce, making them ideal for resource-limited settings.
- **Digital Integration:** These assays are designed for the modern age—results can often be quantified and shared using a standard Smartphone, bridging the gap between the lab and the patient.

Conclusion

Aptamers associated exceptional molecular specificity with synthetic versatility enabling wide range applications for targeting therapeutics including immunothreapy and gene modulation encompassing imaging and biosensors through advancement in stability and sensitivity challenges. Although accelerate their integration into precision medicine, democratizing ultimately personalized healthcare in oncology, infectious diseases and other emerging global healthcare paradigms.

KNOWLEDGE FACT

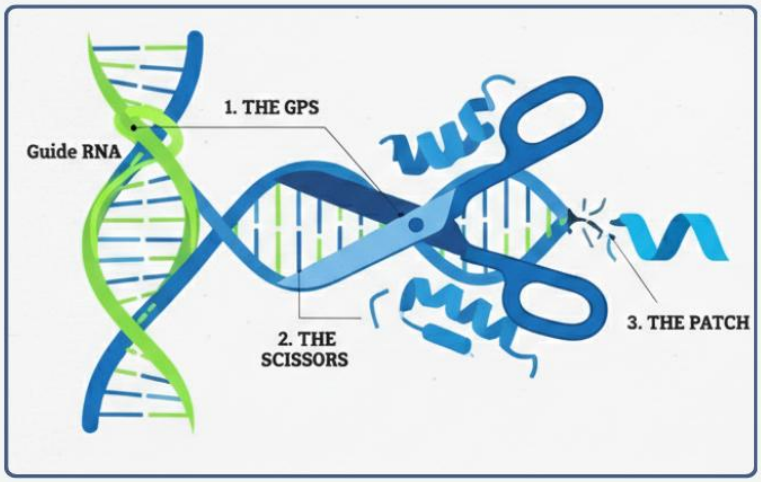
The Genetic scissors:

How CRISPR is Rewriting the Future

The 3-Billion-Letter Library

Imagine every cell in your body contains a massive library. This library has 23 pairs of "books" (your chromosomes) filled with 3 billion letters of instructions. This is your DNA. It tells your body what color your eyes are, how tall you'll grow, and how to fight off a cold.

But sometimes, there is a typo. A single misplaced "letter" out of 3 billion can lead to devastating genetic diseases like Sickle Cell Anemia or Cystic Fibrosis. For decades, scientists could read the library, but they couldn't edit the books. They had to watch the errors happen, powerless to change them. Until now.



The Mechanism: How the "Search & Replace" Works

CRISPR-Cas9 isn't a bulky machine; it's a microscopic protein system that works like a high-tech word processor for life. It consists of two main parts:

1. The "GPS" (Guide RNA): Scientists create a small piece of RNA that matches the exact "typo" they want to fix. It acts like a bloodhound, sniffing through billions of letters until it finds the specific sequence.
2. The "Scissors" (Cas9): Once the GPS finds the target, the Cas9 protein acts as a pair of molecular scissors. It makes a precise cut in the DNA at that exact location.

What happens next? Once the cut is made, the cell realizes its "book" is torn. It rushes to repair the break. Scientists can then "trick" the cell by providing a healthy piece of DNA, which the cell uses as a template to stitch the gap back together. You've just successfully "typed" a new instruction into the code of life.

"Did You Know?"

The Yogurt Connection

Believe it or not, the world's most advanced medical tool was discovered in a snack. In the early 2000s, scientists at a food company noticed that some bacteria used to make yogurt were "immune" to viruses.

They discovered these bacteria were saving "mugshots" of viral DNA in their own genetic code using a natural system called CRISPR. When the virus attacked again, the bacteria used those "mugshots" to find and snip the virus's DNA.

The Result: Today, almost every commercial yogurt and cheese on earth is "vaccinated" using this natural CRISPR process. You've likely been eating CRISPR-enhanced food your whole life!

Why Should We Care?

This isn't just about yogurt or lab experiments. CRISPR is already being used to:

- Cure Blindness: By snipping out genes that cause retinal degeneration.
- Revive Species: Scientists are working to bring back the Woolly Mammoth by "pasting" mammoth genes into elephant DNA.
- Super-Crops: Creating wheat that can grow in droughts or rice that produces more vitamins to end world hunger.

Conclusion

CRISPR is life's ultimate "undo" button. It's a tool that changes everything. The future isn't just happening — we are writing it ourselves.

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