

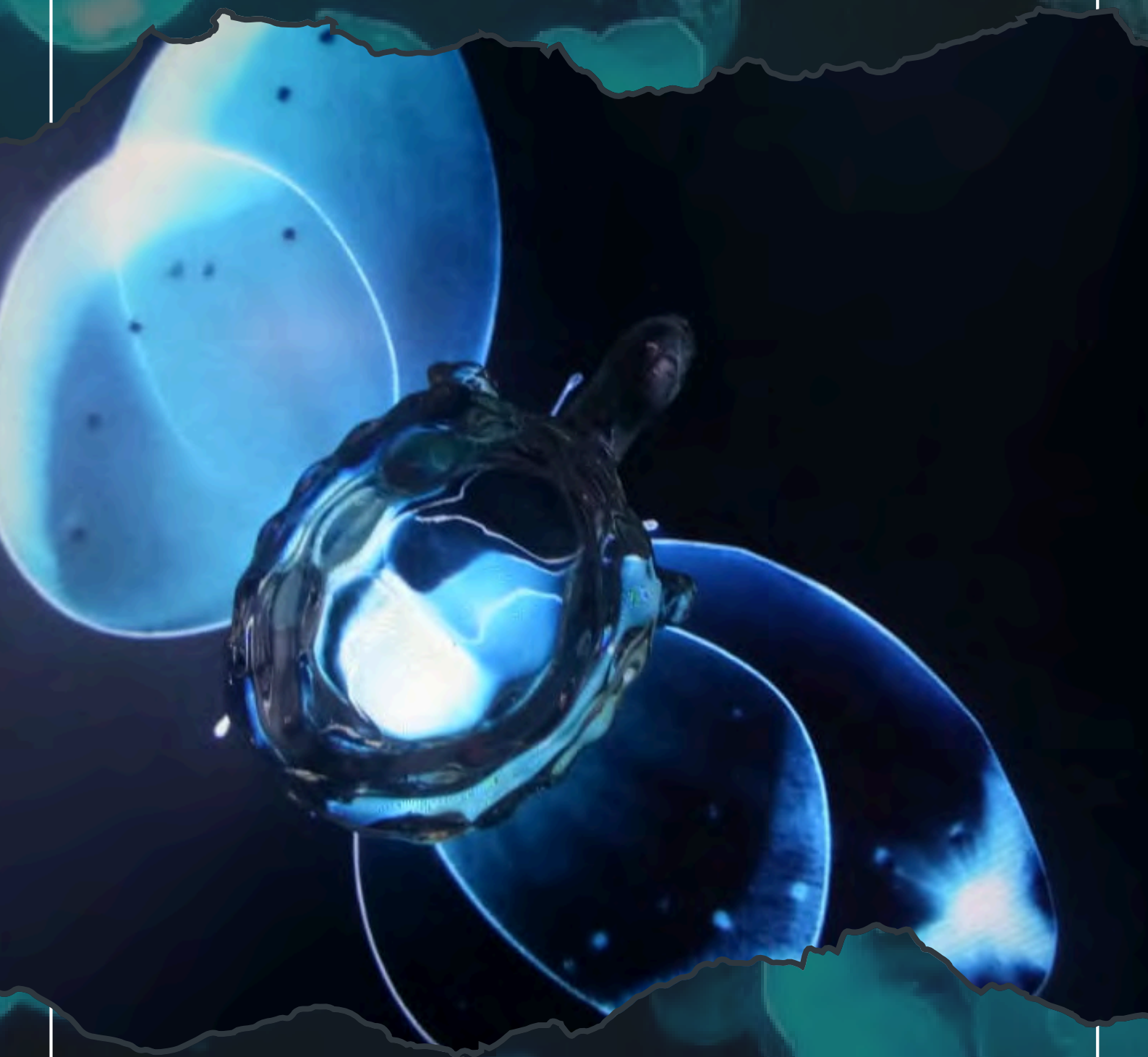
ISSUE 4: 2023-24

ZOOLOGY DEPARTMENT, MAITREYI COLLEGE



IRIDESCENCE

WHERE LIFE FLOURISHES, NATURE PREVAILS



YOUR JOURNEY BEGINS HERE

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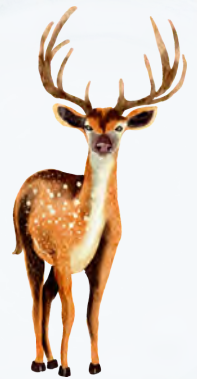
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REMEMBERING OUR PIONEER



In loving memory of ***Prof. Renu Gupta***

In loving memory of Renu Ma'am

I still remember the Nanotechnology class in 2010, where I was supposed to demonstrate SDS-PAGE with Renu Ma'am (Prof. Renu Gupta). Without detailing what happened during the class, Renu mam and I started liking each other's company after seeing the electrophoresis results. She gave me all the comfort a junior could expect in initial years. I can clearly remember the Ecology, Cell & Molecular Biology classes where we shared a bond. Sharing ideas for microtomy was fun, and how she used to listen and appreciate it was a great motivation. Like a student, we always enjoyed the experiments' results, especially the microscopic view of plankton in pond water. You are missed in all the Ecology classes, ma'am; that hole will never be filled. Working with Renu Ma'am was like working with an encyclopedia. She was the problem solver and was always so helpful. She would enlighten you about any topic and was cheerful like a kid. She was at so many places to guide you as a senior, enjoy with you like a friend, and correct you as a well-wisher. I feel blessed to have come across a wholesome personality like Renu, ma'am. My heart fills with grief, and I cannot fathom the fact that she is no longer with us. You will always be missed, ma'am; I wish you all peace and happiness on your journey.

We shall meet again!!!

With a lot of gratitude,

Dr. Archana Aggarwal

Renu ma'am was a dear friend, a mentor with motherly warmth. She was my undergraduate teacher and introduced me to the fascinating subject of cell biology. Her clarity of concepts was inspirational, and later, when I became a teacher, I wanted to imbibe her qualities and wisdom. Fortunately, we started working in the same college and shared the same subject classes. I have learnt so much from her, both professionally and personally. It's difficult to express my thoughts in words for someone who holds a special place in my heart. I still feel your guiding presence and believe that the most meaningful tribute to someone is living by the lessons they imparted.

With immense love and respect,

Dr. Jaspreet Kaur

In loving memory of Dear Ma'am,

Reflecting on this day, my heart swells with emotion and heaviness. It seems like just yesterday when we were browsing through resin jewellery during one of our college departmental fests, and amidst laughter and shared ideas, the concept of preserving our chick embryo for the benefit of our students was born. Whenever I adorn that resin pendant, it serves as a poignant reminder of you. How I wish I could bring back those moments, bring you back somehow.

Your absence weighs heavily, especially in my Medical Diagnostics classes, where your guidance and expertise were invaluable. I long for your presence, whether teaching students the intricacies of blood pressure measurement or sharing much-needed advice as a friend and mentor. Your seniority carried a regal air, at times adorned with a hint of gentle command, yet always accompanied by a motherly warmth that made us all feel cared for.

Our adventures, from educational visits to the zoo with our students to the joyous moments shared with my daughter, are etched in my memory. I wish time could rewind and bring you back into my life.

You are dearly missed, and your legacy lives on in the hearts of those you touched until we meet again.

With love and remembrance,

Dr. Shilpa Bharti

In loving memory of Renu Ma'am, a name used to relieve all problems. I met Mam while being a resource person for a workshop she coordinated. I was amazed to see her dedication and zeal for every work. Not only on the professional level, but she was a fantastic guide on the personal front. I have learned so much from her in my brief interaction period, be it patience, dedication, sincerity, punctuality, and whatnot!

My most unforgettable experience with Mam was when I had to demonstrate plankton in pond water and asked her for help. She taught me every step and instructed me and the students until evening after scheduled classes for an entire week until we discovered all the plankton. I was an admirer of her dedication then and will always be her admirer. It wasn't her time to go, but like we say, good people are needed in heaven, too!

Love and respect

Dr. Princy Hira

"The knowledge and skills we acquired from her will stay with us forever. She was an epitome of wisdom, expertise, and excellence."

Khushi Prajapati, B.Sc. (H) Zoology, III year

It takes a lot of work to write about this message. We never thought that this day would come. It was a great experience to be a student of such an experienced teacher, Dr. Renu Gupta ma'am, who taught us in 1st year. Renu Ma'am taught us how to do our practicals in such a professional way. She used to teach each of us and correct us if we did anything wrong. Being her student and learning to be perfect in our work was a blessing. The way she, just by looking at our diagrams or our slides, pointed out our mistakes and corrected them was just a thing which we all learned from her. She always motivated us and loved us. She was a very kind, loving and cheerful teacher. I will never forget her. She was our inspiration.

We all love you, ma'am, and we miss you, ma'am.

Priyanka Biswas, B.Sc. (H) Zoology, III year

As I reflect on the moments we shared in the classroom or during the projects, I'm grateful for your impact on my life.

I miss the laughter-filled classrooms, the insightful discussions, and the encouragement you always provided.

Though you may no longer be with us, your legacy lives on through the countless lives you've touched. Thank you for being more than just a teacher; you were a mentor, a guide, and a source of inspiration.

Soniya, B.Sc. (H) Zoology, III year

Renu ma'am, was very dedicated and hardworking. Although she appeared strict on the outside, she always helped us when needed. We miss you and your experimental hand.

Sweta Rajak, B.Sc. (H) Zoology, III year





From the Principal's desk

Professor Haritma Chopra

Dearest Readers,

It is with great pleasure and enthusiasm that I extend my warmest greetings to all the readers of the fourth issue of the Zoology Department magazine, Iridescence.

The team Iridescence has been putting in consistent efforts ever since its first publication. The magazine is the showcase of the passion that our students, faculty members, and researchers have for biological sciences whilst sharing their valuable contributions to the field. This year the magazine features a diverse collection of research articles, creative poems, insightful travelogues, captivating microscopic pictures, inspiring photographs, and many more interesting contributions by the Zoology and Life Science students.

I would like to extend my appreciation to the editorial team, advisory board and all the contributing students involved in the production of this magazine. And, I encourage future contributors to keep up with the spirit of the magazine.

Happy reading!

MEET THE EDITORIAL BOARD



EDITORIAL HEAD

JYOTSNA MISHRA
B.SC. LIFE SCIENCE, III YEAR

We meet again!

With this issue of Iridescence, we present to the readers a beautiful compilation of science, wit, and efforts. Each one of our personalities slowly blended in every page, displaying some part of us through words and art. This journey of guiding new members and simultaneously getting inspired with their remarkable ideas made me grow in unimaginable ways. As I graduate this year, I will always cherish the connections I made at Iridescence.

EDITORIAL HEAD

VAISHNAVI RAJAGOPALAN
B.SC. (HONS.) ZOOLOGY, III YEAR

"In the elegance of biology, complexity blooms from simplicity." As the editor of the magazine, I believe in curating experiences that transcend the ordinary, weaving together words and images to evoke emotions and spark imagination. Each page is a canvas where stories unfold with grace, where aesthetics meet substance. At Iridescence, we strive to capture moments that resonate, combining artistry with authenticity to create a blend of inspiration. Join us on this journey of discovery, where every detail is meticulously crafted to expand the horizons of knowledge and ignite curiosity.



KHUSHI PRAJAPATI
B.SC. (HONS.) ZOOLOGY, III YEAR

"Life emerged, evolved and is further progressing." The guidance of the advisory board and influence of my team members have been essential in sculpting a new dimension in me.

At Iridescence, we have endeavoured to highlight the finest aspects of the people around us. Ranging from nature's most extraordinary marvels to the latest advancements in the realm of biology. Our fourth edition invites you to explore and delight in these magnificent compilations.





SONIYA
B.SC. (HONS.) ZOOLOGY, III YEAR

Dear readers, immerse yourself in the latest issue of our magazine Iridescence! From the depth of biology to the expanse of cosmos, our magazine is a kaleidoscope of knowledge. Like the shimmering hues of a butterfly's wings, it reflects the intricate beauty of life across all dimensions. I extend my heartfelt gratitude to our editorial team and advisory board, each interaction with the team and mentors has been a source of learning and growth. I also extend my deepest appreciation to all who have contributed to this edition. Your creativity and dedication have brought our magazine to life.

SWASTIKA DEY
B.SC. LIFE SCIENCE, II YEAR

Since the day I got chosen in this editorial board, time has flown by just in the blink of an eye. Being surrounded by such talented and hardworking women has taught me the value of teamwork, consistent perseverance and determination. My heartfelt thanks goes to the advisory board for choosing me as one of the responsible members to work together to make Iridescence a dream so beautifully attained. Iridescence, as the name suggests, is perceived by everyone through their own lenses of perspectives. Holding in my heart all the memories of the months of hard work gone by, I hope that I am able to keep contributing to this magazine in the days to come and I wish Iridescence immense success and glory.



MEDHAVI KAUSHIK
B.SC. (HONS.) ZOOLOGY, II YEAR

The creation of our magazine 'Iridescence' was a journey of self-discovery and creative exploration. This incredible team of talented individuals has not only helped me unleash my creative potential but also provided me with a fresh perspective on the world around us. In this edition of Iridescence, readers can expect to be transported to enchanting landscapes, introduced to fascinating scientific discoveries, and immersed in the captivating world of art. Whether you are a nature lover, a science enthusiast, or an art connoisseur, our fourth edition has something to offer everyone. Prepare to be captivated by the beauty and wonder that await within its pages.



KHUSHI KUMARI
B.SC. (HONS.) ZOOLOGY, II YEAR

"Success isn't always about greatness, it's about consistency, hard work, dedication and of course, the efforts." The successful release of the fourth edition of our departmental magazine "Iridescence" is because of the efforts and dedication of each team member along with our mentors to provide the readers the best and authentic content. It was an immense pleasure for me to be a part of such a creative and intellectual team. I learnt a lot throughout this journey and gained a new perspective of science and the magnificent beauty of nature. It's a wonderful way for me to discover various new experiences. I believe that the dedication and efforts of each of the members and mentors will be reflected in the eyes of the readers.





NANDINI SRIVASTAVA
B.SC. LIFE SCIENCE, II YEAR

To our esteemed readers of Zoology Magazine, I extend my heartfelt gratitude for your ongoing support and enthusiasm. Your unwavering dedication to exploring the wonders of zoology inspires us daily. As I reflect on my journey with the magazine, I am humbled by the privilege to contribute to a publication that shares our collective passion for zoology. Together, let us continue to delve into the depths of scientific discovery and appreciation for the beauty and complexity of our planet's diverse ecosystems. Thank you for being an integral part of our community, and here's to many more enriching adventures ahead.

HERA SARFARAZ
B.SC. (HONS.) ZOOLOGY, I YEAR

Iridescence—the quality of showing many bright colors that change with different lights—this is how our magazine is crafted as well, justifying its name. From the beautiful animal kingdom to the serenity of nature, it covers it all! The fourth edition of Iridescence yet again promises the diversity of the fellow students and the brilliance of their creative minds. From brainstorming ideas to designing templates and selecting pictures, I'm honored to gain immense learning throughout the entire process of creating this magazine and delivering it to you. I'm truly grateful to my professors for discovering that potential in me and giving this enchanting opportunity to unfold my creative side. Each member in this team inspired me everyday to work harder and aim higher! I hope you all have a wonderful experience going through each page of this magazine, and may it ignite a newfound passion of zoology within you. Happy reading!



SHREYANSHEE VAIDYA
B.SC. (HONS.) ZOOLOGY, I YEAR

Iridescence has been more than just a magazine; it exemplifies knowledge of science in so many ways. I am humbled by the opportunity to contribute to a publication that shares our collective passion for zoology and has extremely supportive mentors, very compassionate teammates, and such enthusiastic readers.

With this issue, we bring creative and intriguing science concepts to light through various articles, infographics, poems, etc. So together, let us continue to dive into the depths of scientific discovery and appreciate the beauty and complexity of our planet's diverse ecosystems. Let's keep learning and sharing the wonders of zoology. I hope reading this issue enriches your love for science the same way it did for me.



THE ADVISORY BOARD



Here we are, showcasing the fourth issue of Iridescence, our department annual e-magazine, which is ever vibrant and flamboyant in itself. This issue explores the diverse aspects of mother nature and life on earth.

As always, we feel privileged to work with young, energetic and dynamic minds who put in their efforts and creativity in bringing out something this amazing. The selection of the editorial team had been a challenge this year, as we received many more applications from students than the previous years, pointing to the fact that our magazine has been gaining popularity consistently amongst the students. The editorial team members so selected have proved their caliber in how they shaped this issue.

This year's magazine has new sections like microcosmos, exploring life through a microscope, and numerous beautifully illustrated compilations, in addition to interesting articles, poetry, intriguing photographs, travel blogs and engaging creative sections. Our team has also included conversations with former students as well as interaction with researchers. We believe that engaging in such discussions would provide inspiration to our students.

Though we miss amongst ourselves, one of the pioneering pillars of this Advisory Board, Professor Renu Gupta, we have maintained the standards of quality and creativity that she had set with the first issue of the magazine in 2020. She has been one of the most powerful sources of inspiration to bring out the best out of the best of the efforts, from each one of us who have been part of this magazine; and her legacy continues as we present this issue with the same dedication and eminence that we learned from her.

The magazine serves as a window into the vibrant life of our institution showcasing the contributions of our students and faculty. So, as you will turn the pages of our magazine, it will take you on a journey of thought provoking sections which stimulate contemplation and encourage critical reflection. We extend our heartfelt appreciation to the editorial team and contributors who helped in bringing out this issue.

We invite you to explore various sections and pages of this edition and join us on this remarkable reading journey.

If you have any questions, suggestions, or concerns, please address them to zoomagazine2020@gmail.com. This will help us to make our magazine better each time.

ADVISORY BOARD MEMBERS:

Dr. Anshu Arora Anand

Dr. Archana Aggarwal

Dr. Jaspreet Kaur

Dr. Princy Hira



STEMinist ERA

Q&A with

Dr. Asha Chaubey

Senior Principal Scientist,
CSIR- Institute of Integrative Medicine, Jammu



"In the quest for knowledge, the scientist sculpts truth from the raw material of curiosity and experimentation."

Question- Please brief us about yourself and your background with fermentation and microbial biotechnology.

Answer- I am Dr. Asha Chaubey, and I work as a Senior Principal Scientist at the CSIR Indian Institute of Integrative Medicine, one of the 37 premier laboratories under Council of Scientific and Industrial Research in Jammu. We have another branch lab in Srinagar. I am based in Jammu and oversee the Fermentation and Microbial Biotechnology Division of the institute. Our mandate is discovery & development of drugs from natural resources. Since my domain is microbial resource, therefore, we use fermentation technology and try to find various industrial applications for microorganisms. Also, the mandate is for drug discovery and development, we strive to find pharmaceutical uses for microorganisms.

Question- What does your daily routine look like in this field?

Answer- The most essential aspect of microbiology and fermentation technology is that microorganisms do not distinguish between day and night. Microorganisms don't function the same way humans do, hence we have to work in accordance with microorganism requirements, so our lifestyle is similar to studying a growth curve. We may have to work day and night, and when a fermentation experiment is underway, we must encourage the microbes' ability to accomplish their jobs regardless of the time of

day.

Question- Why did you choose fermentation and microbial biotechnology as your domain, and what keeps you going in this rigorous field?

Answer- Despite being a very rigorous field, it is also very interesting. Microorganisms have a lot of information hidden with them and we have microorganisms available all over around us. I hope we all can agree on the point that the world and the life is sustaining just because of microorganisms, nothing else. They are the natural healer, the natural degrader and the one which keeps us healthy. Microorganisms can be found everywhere, including our bodies, skin, and guts. So, microbes play an important role in everyone's daily lives. This is incredibly essential, but the rationale is simply that they have a lot of information hidden with them. So, we should do as much exploring as possible. And, as you are aware, we are moving towards Aatmanirbhar Bharat, and the majority of the antibiotics on which we rely are derived from microbes. Right? So now is the time for us to align with the government to prioritize this field. In order to attain the Viksit Bharat goals we must enhance this area and self-sustain in the healthcare sector.

Question- What is the scope of biotechnology in fermentation according to you? Has there always been significance of biotechnology in fermentation or vice-versa?

Answer- The majority of medications and antibiotics we use today are derived from microbes. We can refer to microbes as the source of penicillin. Actinomycin is derived from bacteria. Streptomycin comes from bacteria. All antibiotics come from microbes and as we have to be self-sufficient in India, we cannot afford to continue importing antibiotics and enzymes, both of which are microbial products. We must sustain ourselves. If we want to grow as Viksit Bharat, we must be sufficient in the manufacturing of these antibiotics or enzymes in order to avoid their import. So the Government of India has initiated Biopharma Mission and identified antibiotics that we are buying from abroad. We now have a mission that requires us to develop indigenous processes for their production and self-sustaining for these antibiotics or medications. So this is a rapidly developing field. We need to invest more than 100% on these goals so that, by the time we are 'viksit', we are self-sufficient.

Question- What are some tools used daily by fermentation and microbial biotechnologists?

Answer- Daily tools imply that if we have to keep microorganisms alive, we must first understand the fundamentals of microbiology. A candidate interested in working in this field should have a solid understanding of fundamental microbiology. Microbes will react differently when exposed to different conditions and will react in a different manner when exposed to a growing environment or stressful conditions. As a result, we must also grasp the nature of microbes, including how they grow and how they behave. So, a microbiology tool is a basic scientific skill, such as basic microbiology and molecular biology techniques, about which we must have knowledge in order to better comprehend them.

Question- Are there any upcoming technologies that might revolutionise microbial biotechnology?

Answer- Yes, what we are attempting to accomplish nowadays is to direct microbes using various molecular biology methods. The CRISPR-Cas method is quite interesting. In microbiology, there is a phenomenon known as cryptic biosynthetic pathway expression wherein we can use various technologies to express the silent gene clusters of microbes, we can obtain bioactive compounds, which can be a useful resource when we are encountering antibiotic resistance. For new drug discovery and development, these technologies are particularly significant as they allow us to see the unique qualities of microorganisms that would otherwise be invisible.

Question- Do you face ethical concerns in your biotechnology research? If yes, how do you address them?

Answer- Ethical considerations arise when it comes to use genetically engineering techniques for commercialisation. There are ethical committees at institute level as well as national level. Ethical guidelines are well in place and ethical clearances are obtained appropriately when required. Further, any studies involving in-vivo experiments also require approval from ethics committee of the laboratory. There is a national committee for genetically modified microorganisms (RCGM) that is led by the Department of Biotechnology. They approve the manufacturing of chemicals, vaccines, and antibiotics. This

is the general procedure and all of the regulatory issues must be addressed. These guidelines are publicly available and have to be strictly followed, so not many challenges arise in daily life.

Question- Research demands a lot of trials and failures before a breakthrough is made. How does/ can a scientist handle such setbacks or unexpected results in their projects?

Answer- As already stated that during research and development activity, ups and downs keep coming. We cannot plan anything that is one-sided and trial is required. Efforts need to be made in multiple ways. If one approach or strategy fails, we must adapt to another strategy. So, once we plan, we have a scientific problem, we strive to tackle it. We strategise in several alternate ways. And when we execute it in tandem, if one technique fails, the other will succeed or something else will emerge. Even if our approach fails, what matters most is that we get outcomes, whether positive or negative. So, if we receive negative results, we at least know that this does not work. So, science and experimentation are never negative. The results may be negative or positive, but they are rich in information. Only thing we need to figure out is how to use this set of information. This leads to a breakthrough.

Question- Lastly, if a graduate student wishes to pursue this field, what should be her course of action? Any advice you would like to give our budding scientists.

Answer- Most significantly, any learner with a scientific temperament should ask questions. The Government of India has already launched the Jigyasa Programme specifically for school students to inculcate scientific temperament in the budding minds. Under that, we visit schools and bring students to our research institution also. We discuss science, its scope, basic interesting science experiments, etc. We show them modest, simple experiments to get them excited about this field. The goal is to get students to pursue science and even if only 1-2% start leaning towards this field, we would have achieved our goal. Once students get through these sessions, there are skill development programmes for graduate and postgraduate students under which professional training is provided. They get the opportunity to work in that particular field that they are interested in and may also choose to enter the research field. There are numerous government schemes available for students to study science and there are plenty of opportunities for female scientists as well. If a student is interested, the course curriculum also includes options for a two-month, three-month, and six-month training programme, as well as dissertation work. The student can also visit the research lab or industry and work on simple scientific problems. So there are various other such schemes in which, if you are truly motivated, you can continue to debate with your faculty members and scientists, attend conferences, and study scientific literature. There is a lot of information on the web and if used in an appropriate manner, we undoubtedly will have good budding scientists who will take the lead in the Viksit Bharat. We may or may not be present at that point of time to witness, but students like you will be there to see it. So I would be delighted if some of the good pupils take up science right now and help propel India forward in the Viksit Bharat mission.

Q&A with

Aafreen

B.Sc. (H) Zoology. Batch 2014-17



“Scientists are the pioneers of progress, carving paths through the wilderness of uncertainty and leading humanity towards new horizons.”

Question- Please brief us about your academic and professional self.

Answer- I was born and raised in Bareilly, Uttar Pradesh, where I completed my schooling. I pursued my undergraduate and postgraduate studies at Delhi University. Driven by a desire to conduct research closely linked to patient care, I joined AIIMS, Delhi, for my PhD and currently working on Leukemia.

Question- Is there any particular project you are currently working upon?

Answer- Presently, I am working on gene signatures of Leukemic Stem Cells implicated in chemoresistance in Acute Myeloid Leukemia.

Question- You are currently actively pursuing ‘Genomics’ as a specialization, what made you realize that it was your true calling and what are the future prospects of this field?

Answer- During my post-graduation, I studied genomics and found great interest in it. The field of Genomics holds great promise for driving advancements in healthcare and science as a whole with future prospects in precision medicine, diagnostics and development of therapeutics, making it an exciting and impactful field for individuals to specialize in.

Question- From bachelors to PhD, science is a rigorous field, demanding dedication and resilience at each step. What kept you motivated throughout this path and how

did you reach the milestone you are at today?

Answer- My family has always been my greatest source of support, providing me with the encouragement and resources needed to pursue my educational goals. Whether it was helping me with school projects, attending my extracurricular activities, or simply lending an empathetic ear during moments of doubt, their unwavering belief in my abilities has been a constant source of strength. In conclusion, my family is the driving force behind my decision to pursue a PhD and continue the research journey.

Question- What was the biggest setback you faced in this journey and how did it shape you as an individual?

Answer- The most significant setback I encountered on my journey towards pursuing a PhD was when my mother faced a health emergency, diagnosed with cancer. This period marked a profound shift in my life as I grappled with the emotional turmoil of seeing her battle a life-threatening illness. As my mother embarked on her journey towards treatment and recovery, I became a pillar of strength for my siblings, offering unwavering support and comfort during this difficult time. I juggled my responsibilities at work with caregiving duties at home, striving to maintain a sense of normalcy amidst the chaos. Ultimately, my mother's health emergency became a defining moment in my life, shaping me into a stronger, more compassionate, and empathetic individual. It reinforced the importance of cherishing moments with loved ones and inspired me to pursue a path that would allow me to make a positive impact in the lives of others.

Question- Biology is not always easy, and even scientists sometimes get stuck on a problem and do not know how to proceed. In such cases, where do you turn for help or inspiration?

Answer- When faced with challenging biological problems, scientists, including a PhD student like me, sometimes find ourselves stuck. In such situations, I seek help or inspiration from various sources, including collaborating with colleagues, friends, consulting scientific literature, attending conferences or seminars, and engaging in discussions with mentors or experts in the field. Moreover, for moral and mental peace during these times, I turn to my family, drawing strength from their support and encouragement, which helps me maintain resilience and focus on overcoming obstacle.

Question- With the advent of technology into almost every field, how do you feel about its inculcation with biology, especially ‘Genomics’?

Answer- The integration of technology with biology, especially in genomics, is incredibly promising. It's revolutionizing research and healthcare, allowing for rapid advancements in understanding diseases, developing personalized treatments, and improving overall well-being.

Question- Scientists often have to communicate their findings to people who have no scientific training. How do you do that?

Answer- To communicate complex scientific findings to non-scientific audiences, I strive to use clear, simple language, avoid jargon, and incorporate relatable analogies or simple examples. I also focus on highlighting the relevance and implications of the research in everyday contexts, making the information accessible and engaging to a wider audience.

Question- What is the most surprising finding of your research till now or has there been a moment in this biological journey which left you completely baffled?

Answer- During this journey, I have seen people from all age groups battling with cancer and sometimes kids smiling while receiving chemotherapy. I was baffled by the determination exhibited by these individuals from economically disadvantaged backgrounds in their fight against cancer. Despite facing numerous socioeconomic challenges, including limited access to healthcare, financial constraints, and inadequate support systems, these individuals have demonstrated remarkable strength and willpower in navigating their cancer journey.

Question- What are the tools or skills required by you on a daily basis to succeed in your tasks? Do you still face ethical issues during research?

Answer- In addition to mastering tools and techniques during her PhD, a student's ability to persistently pursue solutions and maintain motivation after encountering setbacks and failures is equally crucial. As for the ethical issues, we need to get ethical clearance from a committee for the protocols that we follow.

Question- What is your take on the statement that ‘scientific findings are a result of luck and accidents’? Is

it purely hard work?

Answer- Scientific findings are a combination of hard work, perseverance, and serendipity. While dedication and rigorous research are essential, unexpected discoveries and chance observations can also play a significant role in advancing scientific knowledge. Therefore, it's not purely hard work; luck and accidents (although rare) can sometimes lead to breakthroughs or insights that propel scientific progress.

Question- What is one thing most people do not know about this field or PhD in general?

Answer- Many people may be surprised to learn how much freedom and self-direction are required when pursuing a PhD. While advisers and mentors provide direction and support, students are responsible for much of the research and problem-solving. This can be both empowering and challenging, as it requires strong self-motivation, time management skills, and the ability to navigate uncertainties and setbacks independently.

Another aspect is dealing with negative people and thoughts, which can be challenging, especially during the demanding process of pursuing a PhD.

Question- According to you, is specialization in one field a must?

Answer- Specialization in one field is not necessarily a must for everyone, as it depends on individual goals, interests, and career aspirations. While specialization can provide depth of knowledge and expertise in a particular area, interdisciplinary approaches are also valuable and increasingly common in many fields, including genomics. I would say the decision to specialize in one field or pursue a more interdisciplinary approach depends on individual preferences, career goals, and the specific opportunities available.

Question- As a woman in STEM, were there any gender-based hurdles that you faced and has the condition improved as we move ahead?

Answer- I have seen my colleagues encounter gender-based hurdles, particularly regarding societal expectations related to marriage and family planning. I have seen girls facing pressure to prioritize traditional roles of wife and motherhood over career advancement, which can create challenges in balancing personal and professional aspirations. It's crucial for PhD guides to understand and empathize with these realities. PhD guides also play a pivotal role in supporting the career development and success of their female students.

Question- A key advice you would like to share with the individuals pursuing/ interested in this field.

Answer- Individuals pursuing or interested in genomics should prioritize skill improvement and remain open to new learning opportunities throughout their academic and professional journeys. In a rapidly evolving field like genomics, staying abreast of the latest technologies, methodologies, and discoveries is essential for success. I personally think that there is a need to excel in skills such as molecular biology, bioinformatics, data analysis, and critical thinking. This will provide a solid foundation for conducting impactful research in genomics.

Q&A with

Mansi Arora

B.Sc. Life Science. Batch 2014-17



"To be a scientist is to dance with the mysteries of the universe, painting the cosmos with the brushstrokes of intellect and intuition."

Question- Please brief us about your academic and professional self.

Answer- I pursued a bachelor's degree in life sciences from Maitreyi College, Delhi University, and a master's degree in forensic science from the National Institute of Criminology and Forensic Science (NICFS), now known as the National Forensic Sciences University (NFSU), Delhi Campus. My career began in cyber forensics as a Digital Forensic Evidence Examiner, collaborating with organizations such as the National Crime Records Bureau (NCRB) and the Directorate of Competition Commission of India (DCCI). Transitioning into academia, I taught M.Sc. Forensic Science students at Kurukshetra University and later became an Assistant Professor at Dyal Singh College, Karnal. Additionally, I was invited as a guest faculty at NICFS. Currently, I am working as a forensic professional at the Central Forensic Science Laboratory (CFSL) in Chandigarh. Besides, I enrolled in a Ph.D. program at NFSU to further elevate my expertise in the field.

Question- Can you walk us through your day as a forensic scientist?

Answer- My daily routine involves a meticulous and multifaceted approach to addressing an adverse range of cases. Each day brings forth unique challenges. We deal with cases involving identification, murder, sexual assault, criminal paternity, etc. The sensitivity of this work cannot be overstated. The consequences of any oversight, particularly contamination, can have severe implications, potentially impacting several lives and related livelihoods. Hence, every step in our process requires utmost caution and precision.

Question- Navigating from bachelors to PhD in science demands unwavering dedication and resilience. What kept

you motivated on this journey? How did you reach your current milestone?

Answer- My motivation throughout this path has been fuelled by a natural curiosity that has always driven me to explore and understand more. Additionally, my mother, who holds a Ph.D. in Psychology and taught for more than 25 years as a special educator, served as a role model, inspiring me to follow a similar path. The prospect of teaching has been a significant passion of mine, and pursuing a Ph.D. became a necessary step as it aligns with the eligibility criteria. Moreover, the encouragement and appreciation I received from my professors at Maitreyi College and NICFS provided invaluable motivation, reinforcing my commitment to achieving the milestones that have led me to where I am today.

Question- You are currently employed as a Forensic Scientist. What made you realize that it was your true calling?

My initial career aspiration in teaching shifted unexpectedly towards forensic lab work, an unforeseen alignment that now feels fateful. The realization dawned during a highly sensitive case involving the assault of a young girl and witnessing the team's relentless pursuit of justice deeply resonated with me. Engaging directly in forensic work illuminated the disparity between theoretical knowledge and practical application, solidifying my conviction that forensic science is not merely a profession, but a true calling driven by a profound sense of purpose and a commitment to effecting meaningful societal change.

Question- What steps should a life sciences or zoology graduate take to pursue forensic science? Are there any essential skills required?

Answer- Currently, numerous reputable organizations offer forensic science courses, and you can gain admission by appearing for a written exam. Notable entrance exams include the Common University Entrance Test (CUET) and the National Forensic Admission Test (NFAT). A robust foundation in biology, chemistry, and physics will significantly enhance your chances of success in these exams. Introductory books like 'Fundamentals of Forensic Science' by Max M. Houck and Jay A. Siegel offer valuable insights into the subject.

Question- What resources did you use to clear the Forensic Admission Test?

Answer- To be honest, I diligently attended all of my graduation classes and rarely missed any lectures. Afterward, I would go home to revise the material and delve deeper into related topics. Shomu's Biology on YouTube also played a significant role in helping me grasp concepts quickly. A crucial part of my strategy was creating a list of doubts and questions, which I would promptly discuss with the teacher the following day and I think that's all I did. Additionally, I enjoyed reading crime novels more as a hobby, but it later proved to be beneficial academically. However, there are many books available today that can serve as valuable resources for preparation.

Question- What can an individual expect from this field? What are the most challenging and best aspects of working in this field?

Answer- In the forensic field, individuals can expect diverse cases, collaboration with experts, the application of scientific principles, continuous learning, and adherence to strict protocols. The challenges include emotional toll, high workload, legal proceedings, and resource limitations. The best aspects involve contributing to justice, intellectual challenges, interdisciplinary collaboration, professional satisfaction, and staying updated on technological advancements.

Question- What are the different specializations within forensic science and which do you focus on?

Answer- The list is exhaustive when looking at it comprehensively, mentioning a few from the top of my head- Forensic Biology and DNA, Forensic Chemical Sciences, Forensic Toxicology, Forensic Anthropology, Digital forensics, Forensic Psychology, Narcotics, Forensic Ballistics, Forensic Questioned Documents, Forensic Serology, Explosives, Forensic Photography, etc. My specialization is in forensic biology and DNA.

Question- Forensic Sciences is an amalgamation of many miniscule fields. How does a forensic scientist approach this on a daily basis?

Answer- Pursuing a master's in forensic science marked a significant shift for me, coming from a background in life sciences. Initially challenged by subjects like ballistics, I found motivation in the diverse nature of the field. Venturing into cyber forensics unexpectedly broadened my expertise, particularly in software and technology. This diverse exposure has given me a competitive edge. Time management is crucial, from case opening to analysis and reporting. Each encounter with a new forensic discipline has enriched my skills and professional identity.

Question- With the advent of technology into almost every field, how do you feel about its inculcation with biology, especially 'Forensic Science'?

Answer- Regarding the integration of technology into biology, specifically in 'Forensic Science', I find it incredibly impactful. The introduction of an 'automated DNA extraction system'

has revolutionized our processes, allowing for the extraction of DNA in just 16 minutes! This not only enhances efficiency but is crucial for addressing high-priority cases where time is of the essence, provided the sample conditions are optimal. While we've made significant strides in automation, it's important to note that the field is still evolving.

Question- What was the most surprising finding of your research till now or has there been a moment in this biological journey which left you completely puzzled?

Answer- My research focuses on creating a model that uses DNA profiling data to predict an individual's geographic location. We've developed three prediction models that can aid investigating agencies in cases where no reference sample is available for comparison of profiles. Our findings have been published in the "Annals of Human Biology" journal. However, a challenge we've faced is the reluctance of individuals to share their published data, hindering collaborative efforts in the field.

Question- What tools do you use on a daily basis to analyze a variety of evidence?

Answer- We employ standardized protocols for forensic biological and DNA examinations depending on the nature of the case. Additionally, we utilize software such as PatCan for paternity index calculation and GeneMapper IDX for electropherogram analysis.

Question- Can you share a particularly memorable or challenging case you've worked on and how forensic science played a crucial role?

Answer- Yes, a recent case that we worked on and solved involved a 13-year-old disabled girl who was sexually assaulted by her neighbour. The interrogation process was challenging. However, we were successful in extracting the victim's DNA from the undergarment of the accused and were able to help the law enforcement agencies reach their final verdict. The accused got 12 years of imprisonment!

Question- As a woman in STEM, were there any gender-based hurdles that you faced and has the condition improved as we move ahead?

Answer- As a woman in STEM, I've faced gender-based challenges but have seen improvements over time. Despite initial hurdles, the quality of my work has spoken for itself. While some biases still exist, society is becoming more gender neutral. Moving forward, we aim for greater inclusivity and breaking down remaining barriers in STEM.

Question- A key advice you would like to share with your juniors.

Answer- I would encourage them to explore and identify what genuinely brings them joy. Throughout my professional experiences, I have encountered two types of people: those who work solely for their basic salary and those who understand the importance of their work and its consequences and are passionate about what they do. Yes, working is really important but the most important thing in life is keeping yourself healthy, not just physically but also mentally. Stress management is paramount, as one's well-being is priceless, and even a high salary cannot fully compensate for a compromised body. When you are working, maintain honesty and integrity; spend time with your family because that's the real support system that will always be there for you; also, spare some time for yourself and focus on self-growth. Respect your seniors and always be humble. Every year try to become better than the previous year's version of yourself. That's my advice to everyone!



OCCULAR EPIPHANY



Priyanka Biswas
B.Sc. (Hons.) Zoology
III Year



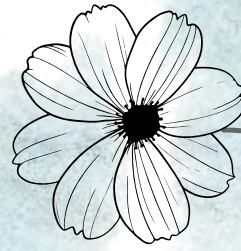
Priyanka Biswas
B.Sc. (Hons.) Zoology
III Year



Priyanka Biswas
B.Sc. (Hons.) Zoology
III Year



Sakshi
B.Sc. (Hons.) Zoology
III Year



Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year



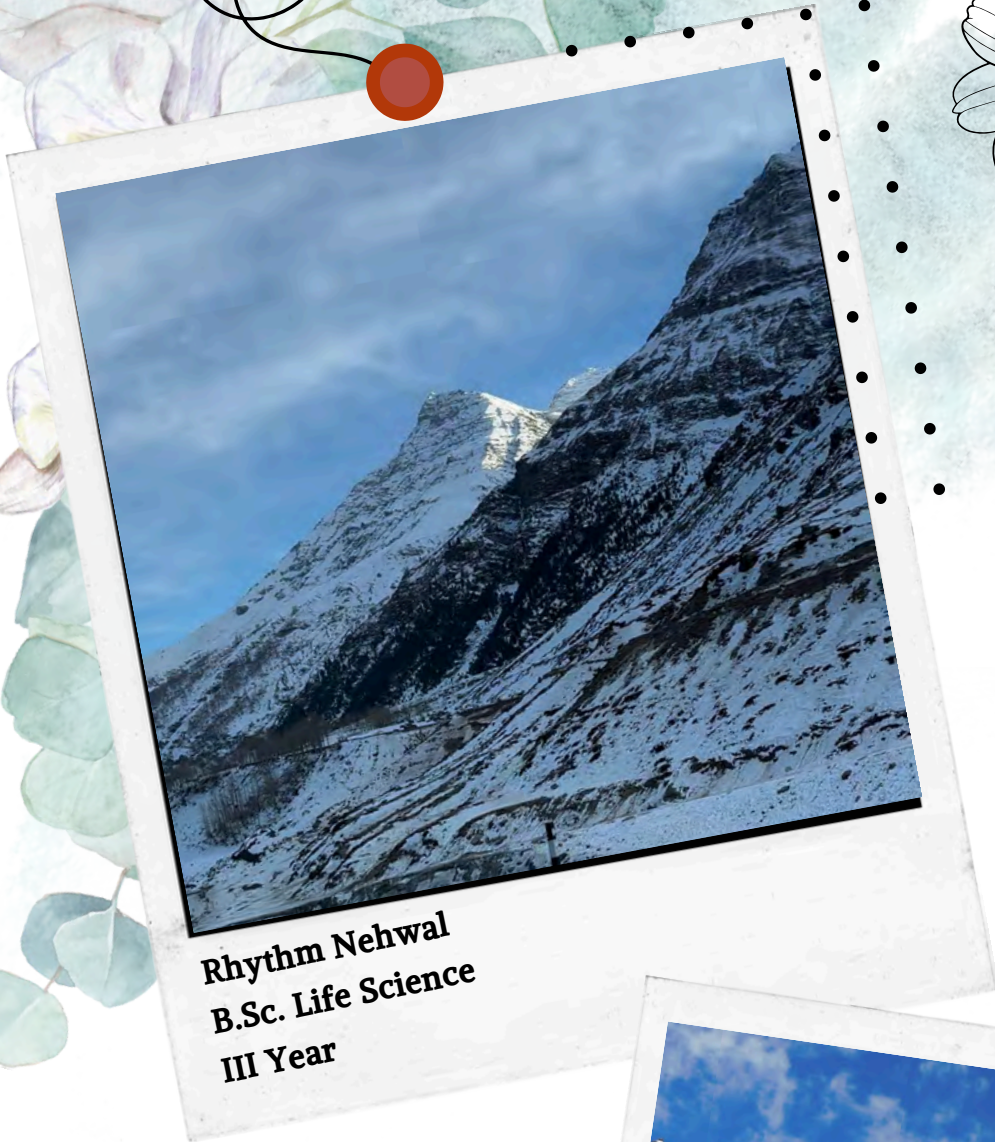
Soniya
B.Sc. (Hons.) Zoology
III Year



Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year



Soniya
B.Sc. (Hons.) Zoology
III Year



Rhythm Nehwal
B.Sc. Life Science
III Year



Nivedita Rai
B.Sc. Life Science
III Year



PONDER & PEN

WILL CRYOGENIC SLEEP EVER BE A REALITY?



Source: *Cryogenic sleep* by MASTROSS21 on DeviantArt. (2023, March 5). DeviantArt. <https://www.deviantart.com/masstross21/art/Cryogenic-sleep-952353767>

Hello there! Well, If you and I ever had a conversation, then you probably know that how we discuss the different curiosities that eventually end up putting even more mind boggling questions and give us the sense of an idea that there is still a lot more to figure out and even much more to research because anyways that's what makes us stay sane and keep going right?

So, today we will be discussing about a speculative concept which goes by different names such as hyper sleep, deep sleep, suspended animation, cryonics, cryosleep or originally "The Cryogenic Sleep".

As the topic popped up, do you know anything about it, like what this exactly mean? Or are there even the possibilities to make this happen? Well, let's talk about it.

As the topic suggests the Cryogenic Sleep simply is a theoretical concept where an individual's body is being preserved under the extreme low temperatures somewhat below -196°C or -321°F that somewhat decreases the biological functioning of a body by lowering it's metabolic activities and induce a state of suspended animation.

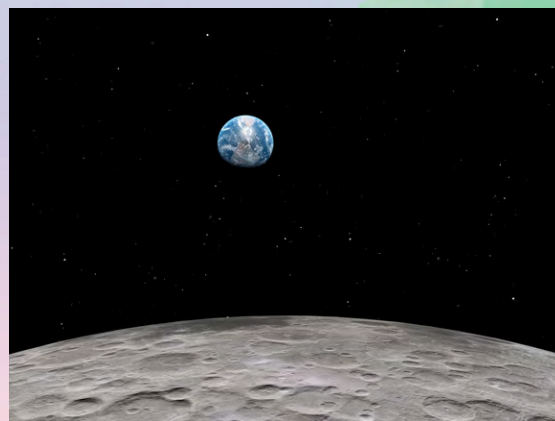
Although, it's implementation isn't practically possible just yet. Well; that's what we are here for, the question which our title suggests. Since Cryosleep is a popular theme in medical treatment or in science fiction allowing extended period of space travel just like we saw in the movie *Interstellar* or if we take reference from the Jennifer Lawrence and Chris Pratt's 2016 movie the "Passengers" where they had to travel to a distant colony planet but unfortunately woke up from their "hibernation pods" 90 years earlier due to a malfunction. From this example, we could tell that the whole idea is to preserve the body and reduce metabolism just as we humans are when we are in a state of subconscious or upon falling asleep when thousands of neurons in the brain switch from waking to sleeping state, reinforcing the cardiovascular and immune system and helps to regulate biological activities. The brain undergoes changes in electrical activity, transitioning through different sleep stages like REM (rapid eye movement) and non-REM or deep sleep, characterized by a decreased heart rate, body temperature, and decrease in blood pressure reaching their lowest levels, crucial for physical restoration and growth, with increased blood supply to muscles.

It's just that applying the right concept on point and connecting the dots wherever and whenever necessary like we just now tried to relate a natural cyclic state of subconscious and not a scientifically validated method for human rest, the cryogenic sleep. Although! Both involve alterations in the body's state while not being directly related in terms of mechanism and purpose.

See! Job well done, we have come so far digging in different concepts relating to our topic of interest. However, there's another indirect concept residing behind i.e. entropy, we know that entropy is a thermodynamic concept that generally refers to the state of randomness or disorder in a system. The connection of entropy lies in the fact that lower temperatures lead to a reduction in molecular motion and activity. As the temperature decreases, the entropy of a system tend to decrease as well. In cryonics the goal is to minimize entropy of the body, slowing down decay and preserving biological structures. Hence, an indirect approach.

After all these discussions and theories that we encountered there's still one question we are still lingering on i.e. Will cryogenic sleep ever be a reality?

Well well, as far as of my knowledge update of January 2022 cryonics is not a mainstream or widely accepted practice in the scientific and medical communities but it's a highly recommended area of research and recently NASA , together with the Atlanta-based SpaceWorks Enterprises, unveiled plans to dramatically change the way we do space travel through the use of cryosleep, it's not just a science fiction anymore.



Source: Canva photos

NASA has developed a cryogenic sleep chamber for astronauts that lowers the astronaut's body temperature to 32°-34°C, triggering natural hibernation by sending the metabolic rate into suspended animation. But the take here is that currently it can only be possible for upto two weeks. Dr. Bobby Braun, former chief technologist, said, "Anytime you introduce humans, it's an order of magnitude or two more challenging" when he was working on trip complexity for the mission to Mars that has remained out of reach because of cost and sheer mass of human load. By which he emphasized on the added complexities and difficulty involved in a mission or a projects that involve human space exploration or forsay any scientific exploration, since, cryonics being one of them, it also comes with various challenges and difficulties like the technique hasn't been successfully perfected yet, secondly hibernation doesn't completely stop aging it just slows down the aging process. With advanced technology which we do not came across yet, aging could be significantly slowed down perhaps for centuries but the idea of "cheating death" is still far, although we did heard about the unfounded and persistent controversy theory of Walt Disney the co-founder of the Walt Disney company, the creator of our animated fantasy world, who had forced our brain to explore beyond imagination and turned our "castle in the air" into a face and gave it a voice, Disney was cryogenically frozen after his death and hoped to revive in the future. However, there's no factual basis of this claim. Despite the lack of any credible evidence the theory persists as an urban legend likely from the fact that Disney has expressed an interest in science and technology advancement.

Well, there are many questions and curiosities popping up when it comes to cryonics or cryogenic sleep coming from a background of multiple research and a committed aim to make it a reality, and a part of it has been achieved so far, Kudos to the great minds behind but still the concept has to reach it's extend for a big reveal in the history of scientific research ever witnessed to mankind.

I'm saying this because us humans are capable of anything until and unless we stop imagining, as Albert Einstein said "Imagination is more important than knowledge. Knowledge is limited, Imagination circle the world." And since cryogenic sleep is the result of human imagination it will indeed circle upon an extent of reality.

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- <https://www.treehugger.com/cryosleep-its-not-just-science-fiction-anymore>

AN UNTOLD STORY OF ORFan (ORPHAN GENES)

An ORFan was sitting at locus 4p22.1 and looking at the nucleoplasm around. Suddenly, dnaA came in and sat next to the ORFan. dnaA said to ORFan, “Why do you seem so sad today?” ORFan replied “I want everyone to know my identity, I no longer want to remain anonymous”. Hearing this, dnaA replied “Well, I know, it’s hard to stay unidentified with no unique name of yours, but you should not lose hope. I know many researchers are trying novel ways and doing different experiments just to reveal you and what all potential you have in you... It’s just a matter of time!”. ORFan listened to dnaA carefully and smiled with a rekindled hope that one day its identity and function will be revealed to the world outside.



Source: Canva photos

After reading this, you might be wondering what an ORFan is? Well, as the name suggests and rhymes like ‘orphan’, it means almost the same. It’s a gene whose function is yet to be identified. The genes with unknown function are called orphan genes and the transcripts and peptides of orphan genes are called ‘hypothetical’ or ‘uncharacterised’ proteins (Ijaq et al., 2019). They are called so because their exact function cannot be identified by similarity searches in nucleotide or protein databases. In other words, these genes do not show significant matches with any known genes or genes with known function. For example, dnaA gene initiates chromosome replication in bacteria, so its function is known. So, different wet-lab efforts are required to reveal the identity of orphan genes and the functions performed by them in an organism. Orphan Genes (OGs) are also defined as genes lacking detectable homologs in other species.

So, in order to understand the origin of these orphan genes, let’s discuss some theoretical background on ‘gene finding’ approaches. To understand this, I invite you to read the following paragraph

kjfhjkgjkjoteiitgkjjfghdfjakhsjkjhakjhddoorhhjkjsdkjasjdkljklasjdwassdjasjdkjlkajdkljlakkjaskljklaajksj
klajhhfdkjkhkfhopenjkhkhfdhfijsfkdsfkjdfakjsamfkdlmsmkjkgkldlkflklkflkadsk

Well, that did not make any sense to you, right? But, if I add some punctuation marks and find out nouns or verbs from the given text above (underlined below), it starts making sense.

kjfhjkgjkjoteiitgkjjfghdfjakhsjkjhakjhddoorhhjkjsdkjasjdkljklasjdwassdjasjdkjlkajdkljlakkjaskljklaajksj
klajhhfdkjkhkfhopenjkhkhfdhfijsfkdsfkjdfakjsamfkdlmsmkjkgkldlkflklkflkadsk

In a similar manner, a DNA sequence composed of just 4 letters (A, T, G and C) arranged in an order does not mean anything except when we start annotating that sequence. In other words, we try to find the presence of ORFs or Open Reading Frames followed by genes or coding sequences in that sequence. Since, we know that an ORF starts with a start codon (AUG or GUG) and ends with a stop codon (TAA, TAG or TGA) with ribosomal binding site upstream of start codon, we can easily locate such genetic elements in a given sequence. So, if we find any ORF, we can simply mark it.

The identity of this ORF can be revealed if we find significant similarity match in a biological database like NCBI. In other words, we can find out if this ORF is actually coding for some RNA or protein. Now, if we get some significant hits in the database for our query ORF sequence, we can deduce its function but an absence of significant hit means that a statistically significant similar match of our query sequence was not found in the database, hence its function cannot be elucidated. Such genes are termed as orphan genes or ORFans and their products are called hypothetical proteins.



Source: Canva photos

So, various in-silico and wet lab efforts are required to find out the functions of orphan genes because their identification may contribute in unraveling novel adaptations and regulation of physiological processes (Fakhar et al., 2023).

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Dr. JASPREET KAUR
Assistant Professor
Zoology Department



Unjumble The Jumble



1) R A U S U S T O E G S

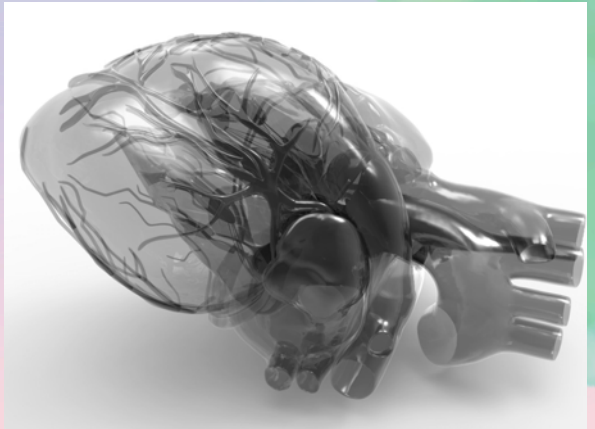
(hint:- name of a dinosaur which has 17 plates that lay vertically flattened along its back)

2) A I C E A L G A P H

(hint:- medical term used for headache)

ARTIFICIAL HUMAN ORGANS

In the ever-evolving world of science and technology, researchers thrive to solve the mysteries of nature and get inspired from it for formulating the solutions to complex problems emerging in every field. This approach, known as Biomimicry, seeks to mimic the natural processes and functioning but in a modified manner according to the necessity. The field of medical science has also witnessed many remarkable progress that can revolutionize healthcare. One of the advanced lifesaving examples of biomimicry in medical science includes artificial human organs or synthetic organs to replace the damaged naturally occurring organs, increasing the life time of the patient to some extent.



Source: Canva photos

While waiting for organ donors many patients die and for those who are able to get perfect match for their organ transplant run on immunosuppressants for the rest of their lives which puts the recipient at risk by degrading their immune system. At present more than 1 lakh people of all ages are on the waiting list for their organ transplantation, every 8 minutes another person adds to this list out of which 17 people die each day while awaiting their organ transplant. These two critical hurdles are mainly focused upon by the researchers while searching for new alternatives for building the most efficient and feasible organs in the lab. Let's see how unique solutions scientists throughout the world are building to transform the conventional technique of organ transplant.

Some of the innovative ways for manufacturing the artificial organs includes use of stem cells, decellularization technique, 3D printing technique, CRISPR-cas9 technology and many more. Let's take a closer look at these unique approaches individually which are slowly replacing the conventional method of organ transplant.

Patient's own stem cells could be a major breakthrough to overcome both the organ shortage and tissue rejection by the host immune system. A single stem cell extracted and purified from the tissue of the patient has the capability of building an entire organ. These organs grown using embryonic stem cells or pluripotent stem cells are called organoids. You will be surprised to know that the mammary gland and prostate gland can be generated in vivo using a single adult stem cell from the tissue. It has been successfully done on mice, the problem we currently face in human is the lack of reliable method to isolate mammary stem cells. Other organs like kidney, lungs and liver could be generated using embryonic stem cells via blastocyst complementation in which blastocyst is first genetically modified for the development of targeted organ and after modification pluripotent stem cells are introduced into it. This method aims to generate personalized human organs for transplant using a patient's own induced pluripotent stem cells, the development of the organs in this method is to be done in large livestock animals.

CRISPR-cas9 a revolutionizing gene editing technology that allows for permanent gene editing at a targeted site is also proposed by the researchers to engineer laboratory grown human blood vessels and organs that do not express proteins which cause rejection of transplanted tissues and organs.

Organ manufacturing generally requires architectural predesign, a scaffold to act as a template for tissue generation. Here techniques like 3D bioprinting and decellularizing tissue comes into view. Scientists use 3D bioprinting technique to fabricate bio-scaffolds that mimic the extracellular matrix of the desired organs.

This technique uses biopolymers or stem cells as bioinks, which are filled into the 3D printer. The 3D printer then uses this ink to print a 3D organ which are prototypically similar to the real organs. Decellularization technique involves isolating the extracellular matrix from its native cells and genetic material to create a natural scaffold.

This technique helps to regenerate damaged organs by removing cellular components that may cause immune rejection.

This way, by drawing inspiration from nature's design, scientists are creating solutions that are not only feasible to us but also prioritize sustainability and efficiency.

These bioengineered organs hold the potential to address both the shortage of organ donors and to provide the customized organs which won't be rejected by the recipient's immune system. It offers hope to countless patients and their families waiting for their life-saving organ transplant. Despite all the progress made till date, more work is needed to overcome the challenges that come with the clinical applications of these unique techniques.



Source: Canva photos

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HIMANSHI YADAV
B.Sc. Life Science
II Year

Unjumble The Jumble

- 1) C R A C N I O M A N E D A
(hint:- malignant tumour originating in glandular tissue)
- 2) T N N I A O D O C M
(hint:- having both alleles expressed equally in the phenotype of the organism)

A TALE OF TWO WORLDS: ORAL BACTERIA & HEALTH OF YOUR HEART



Source: Canva photos

There has been a growing interest in medicine regarding the connection between overall health and dental health. The complex interplay between heart and oral health is further illuminated by research that points to a possible link between oral bacteria and cardiovascular disorders. The evidence, mechanisms, and implications of the link between oral bacteria and cardiovascular disorders are explored in this article.

The oral microbiome is a complex and diverse microbial community that lives in the human mouth. Even though many of these microbes support oral health, if some bacteria are not adequately managed, they might cause dental problems. In a delicate balance, bacteria, viruses, fungus, and other species cohabit in the oral microbiome.

A widespread and frequently chronic ailment that affects the gums and the tissues that support the teeth, periodontal disease has been a focus of research on the relationship between oral and systemic health. Gum inflammation is a hallmark of gingivitis, an early stage of periodontal disease, whereas periodontitis affects the deeper tissues and may result in tooth loss. According to research, cardiovascular problems may develop or worsen as a result of the bacteria linked to periodontal disease. Some of the implicated bacteria include *Porphyromonas gingivalis*, *Treponema denticola*, and *Tannerella forsythia*. Through swollen gums, these germs can enter the circulation and perhaps go to the heart and other organs.

Inflammation is one theory as to how oral bacteria and cardiovascular disorders are related. Cardiovascular disorders and periodontal disease are both characterized by chronic inflammation. One of the main factors in the development of heart disease is the production of atherosclerotic plaques in the arteries, which can be attributed to the inflammatory reaction set off by oral bacteria. One of the main factor of cardiovascular disorders is atherosclerosis. Research has indicated that specific oral bacteria may have a role in the initiation and advancement of atherosclerosis. These bacteria may trigger an inflammatory response that leads to the buildup of fatty deposits and the hardening and constriction of arteries.

The inner lining of blood arteries, or endothelium, is essential to vascular health. Endothelial dysfunction has a connection to a number of cardiovascular conditions. Studies reveal that oral bacteria may impact endothelial function in the bloodstream, which could lead to the emergence of cardiovascular problems. The immune system's reaction to oral microorganisms is a double-edged sword. Even while the immune system works to defend the body against dangerous foreign invaders, repeated contact to oral germs can result in a persistently inflamed condition. The intricate relationship between the immune system and the oral microbiota is highlighted by the possibility that the immune response may be a factor in the vascular damage linked to cardiovascular illnesses.

The connection between cardiovascular illnesses and dental health extends beyond the direct impact of oral bacteria. Heart problems and periodontal disease are linked to variables including smoking, eating poorly, and not practicing proper oral hygiene. Taking care of these lifestyle issues can benefit cardiovascular and oral health.

Numerous clinical studies have explored the potential connection between oral bacteria and cardiovascular diseases. While the findings are not entirely consistent across all studies, there is a growing body of evidence supporting the association. These studies utilize various methodologies, including microbiological analyses, epidemiological investigations, and experimental models, to unravel the complex relationship between oral health and cardiovascular well-being.

Preventive measures have become more important because of the possible connection between oral bacteria and cardiovascular disorders.

The prevention and treatment of periodontal disease depend heavily on maintaining proper oral hygiene habits, which include frequent brushing, flossing, and expert dental cleanings. These procedures not only improve dental health but may help improve cardiovascular health in general. The oral-systemic relationship has been recognized, which emphasizes the value of interdisciplinary cooperation between dental and medical experts. Preventive techniques and therapies that are more complete and successful can result from integrated care that targets cardiovascular and oral health. More and more medical professionals are realizing how important it is to treat oral health as a whole.

In a nutshell, the connection between cardiovascular illnesses and mouth bacteria reveals an intriguing and complex environment inside the human body. Further investigation is necessary to completely comprehend the underlying mechanisms, but the data points to a possible connection that may surpass the divisions of distinct bodily systems. Recognizing the complex interrelationship between cardiovascular health and oral health creates opportunities for holistic approaches to healthcare and highlights the role that preventive treatment plays in preserving general health. The combination of cardiovascular and dental care may open the door to more potent methods of well-being promotion as science works to understand the intricacies of this link.



Source: Canva photos

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VAISHNAVI RAJAGOPALAN
B.Sc. (Hons.) Zoology
III Year

TEACHER FROM NATURE

One serene morning, Leonardo Da Vinci was observing birds. He was very much intrigued by their flying mechanism. He drew many sketches of bird's anatomy and studied them carefully. He made an ornithopter flying machine- for humans. But it didn't work. He was one of the people who used ideas from nature before.

Mother nature has many valuables. From flora and fauna to many mesmerizing natural processes. We can learn from nature by applying their fundamentals. The field related to this is Biomimicry- a practice that seeks to solve problems with human design by studying and imitating natural strategies. For instance, Slime mould inspired city planning; Mosquito proboscis inspired a less painful needle; Diatoms and Aquaporins inspired water desalination and filtration; Kingfisher, an Owl and a Penguin inspired a Japanese bullet train; Termite mounds inspired building design for efficient cooling and ventilation, etc. Biomimicry can also be applied in the medical field. This will help in the better development of techniques for disease diagnosis and treatment.

Some of the animal inspired innovations are:

1. Parasitic Wasp-inspired Needle

Inspiration: Ovipositor of female wasp; for laying eggs inside a caterpillar.
 Developed by: Researchers- Paul Breedveld of Delft University of Technology and Johan van Leeuwen of Wageningen University,
 Innovation: A needle with seven interchangeable rods and one fixed rod can bend to create S shapes with little effort, which makes it perfect for administering drugs and operating on sensitive body areas.



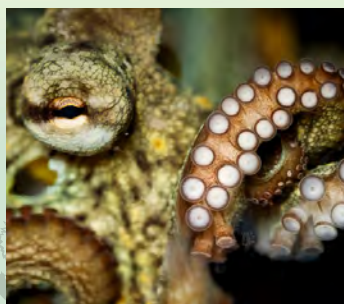
Source: Canva photos



Source: Canva photos

2. Gecko-inspired Surgical Glue

Inspiration: scaly surface of a gecko's foot.
 Developed by: MIT Institute Professor Robert Langer and Jeff Karp, professor of Medicine at Harvard Medical School, Brigham and Women's Hospital.
 Innovation: Gecko adhesive is a biodegradable bandage for organ and tissue repair that is made of nanostructures.



Source: Canva photos

3. Octopus-inspired Sucker for Tissue Grafting

Inspiration: Octopus's tentacles sucker
 Developed by: Hyunjoon Kong, a professor of chemical and biomolecular engineering at the University of Illinois, and his group.
 Innovation: A sucker which can effortlessly pick up and release a graft with minimal pressure.

4. Peacock-inspired Biosensors

Inspiration: Unique feather colours of peacock
 Developed by: Engineers at the University of Surrey and the University of Sussex
 Innovation: Graphene-like photonic crystals mimic patterns, allowing color changes in response to light, temperature, chemical changes, and strain, useful in medical applications like biosensing, bio-monitoring, and healthcare safety.



Source: Canva photos

5. Electric Fish-inspired Catheter

Inspiration: electric fish and its ability to generate an electrical field to navigate.

Developed by: Johns Hopkins University

Innovation: A catheter that can traverse complex blood vascular pathway without the use of radiation or fluoroscopic dyes.



Source: Canva photos

6. Electric Eel-inspired Power Source for Artificial Organs

Inspiration: knifefish, or electric eel, also utilizes electricity by generating quick pulses to shock and stun its prey.

Developed by: Engineers at the University of Michigan in Ann Arbor

Innovation: Engineers created a synthetic organ using hydrogels and salt, capable of producing 100 volts, potentially enabling small medical devices like pacemakers to power themselves using naturally occurring body processes.



Source: Canva photos



Source: Canva photos

7. Parasitic Worm-inspired "Theragrippers"

Inspiration: Hookworm

Developed by: David Gracias and Florin Selaru at Johns Hopkins University

Innovation: A microdevice called theragripper, a star-shaped device coated with paraffin wax, can be embedded in the intestine to slowly release medication. This could be a solution for gastrointestinal issues where current medications don't take effect before being pushed out.



Source: Canva photos

8. Puffer Fish-inspired Device to monitor Ulcers and Tumours

Inspired by: Puffer fish

Developed by: Engineers at MIT

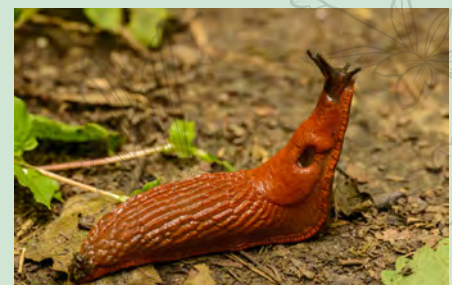
Innovation: A new ingestible pill, inspired by puffer fish, can inflate to a ping-pong ball and stay in the stomach for up to a month, aiding doctors in studying tumors and ulcers. Made from two hydrogel layers, it inflates and deflates based on chemical reactions.

9. Slug-inspired Adhesive for Wound Healing

Inspiration: Slug slime

Developed by: Engineers at the Wyss Institute at Harvard University

Innovation: A new surgical glue, made from alginate and polyacrylamide, is a strong, flimsy material that can withstand three times the tension of current medical adhesives, making it an ideal alternative for repairing parts of the body that move.



Source: Canva photos

10. Mosquito Proboscis-inspired Less Painful Needle

Inspiration: Mosquito Proboscis

Developed by: Researchers from Ohio state university and Osaka's Kansai University

Innovation: The device has two needles for blood or medication injection and numbing (like mosquito saliva). Although costly, it's a great starting point for kids or those afraid of needles.



Source: Canva photos

Humans are considered as the most intelligent species on the Earth. But there are other great and unseen geniuses. We just have to find these hidden secrets for developing new technologies and a better future. Biomimicry should be applied in all fields.

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KHUSHI PRAJAPATI
B.Sc. (Hons.) Zoology
III Year



Unjumble The Jumble



1) A L A A I S A C H

(hint:- failure to relax the smooth muscle fibers of gastrointestinal tract)

2) P O B D Y S M O R O P H H

(hint:- fear of physical deformities)

UNRAVELING THE SECRETS: HOW DNA IS EXTRACTED FROM HAIR?



Source: International Maize and Wheat Improvement Center. (n.d.). DNA extraction. Flickr. <https://www.flickr.com/photos/cimmyt/4616196569>

Deoxyribonucleic Acid or DNA contains the blueprint of proteins in our body. It is the fundamental genetic code that carries the instructions for the development, functioning and maintenance of all living organisms. Extracting DNA from various sources has become a crucial aspect of scientific research, forensic investigation and genetic testing. A total of 99% of human's DNA have similarity in different individuals, only a relatively small amount of DNA are different from each other, which is equal to one nucleotide per 1000 nucleotides; this difference helps in performing test to distinguish different individuals. One such method is to extract DNA from hair, which we will see in this article.

Hair is one of the common pieces of evidence which is found at crime scenes or used to determine the relationship of two individuals. DNA extracted from the hair has both mitochondrial and nuclear components. Hair follicles have the most DNA reserve as the cells are actively dividing here. Hair shafts have very low DNA content, but the hair shaft is also an important source of DNA used in forensic science as all the hair found at crime scene contains the hair follicle but has hair shaft. So, let's know how the DNA is extracted?

Firstly, the hair samples are mostly preferred to collect the hair with follicles intact. Then, purify or clean the sample from any external contaminants. Hair is then cut into small pieces and digested using enzymes to break down the cells and release the DNA. Purification of the DNA using various methods to remove lipids, proteins and other impurities. Quantification of the extracted DNA, then amplification of the DNA using Polymerase Chain Reaction (PCR) based on short tandem repeats (STR). The amplified DNA is then denatured. Then it is genotyped and analyzed based on the generated DNA profiles.

In conclusion, the extraction of DNA from hair is a meticulous process that opens doors to a wealth of information about an individual's genetic makeup. Its significance extends to medical developments, anthropological studies, and criminal investigations, providing a window into the complex genetic code that makes each of us unique. The extraction procedure gets more sophisticated as technology develops, opening up even more opportunities to comprehend and make use of the data stored in our hair follicles.

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PRIYANKA BISWAS
B.Sc. (Hons.) Zoology
III Year

ARE HUMANS THE SUPERIOR SPECIES?



Source: Canva photos

Sounds not right? If we are not the fastest nor the strongest then what makes us dominate the world? It's all a game of evolution the way we evolved. Charles Darwin said he who survives is the fittest and we are still in that race. Let's see what adaptations help us survive and flourish so far.

Early Humans and process of evolution. Have you ever noticed your perfect tendency to pronounce 'onomatopoeia' and hard words like, primates tend to have a comparatively wider vocal repertoire; i.e., the cortical association areas that manage voluntary control over behavior and brainstem nuclei involved in control of muscles governing local vocal production.

Thanks to these two features, we can convey our thoughts and information. Have you ever experienced the gratitude of having both hands at your side while walking? Our fully upright posture, complete with a lumbar curve in the lower back, may cause excruciating pain on hectic days; it did allow our early Ancestors to run with weapons in hand, contributing to our hunting process.

Do you remember any day when you didn't wear any clothes? No, right? While it is way too common for our pets. It's just because humans have thinner, shorter, lighter hair on most of our bodies, so it's easy to think of us as 'naked.' But no, we didn't wear clothes since the start, around 2 million years ago, an adaptation caused in members of the genus '*Homo*' which increased the number of eccrine sweat glands, helping our body stay cool on most warm days, and while running, which most mammals got on their palm and sole of feet.

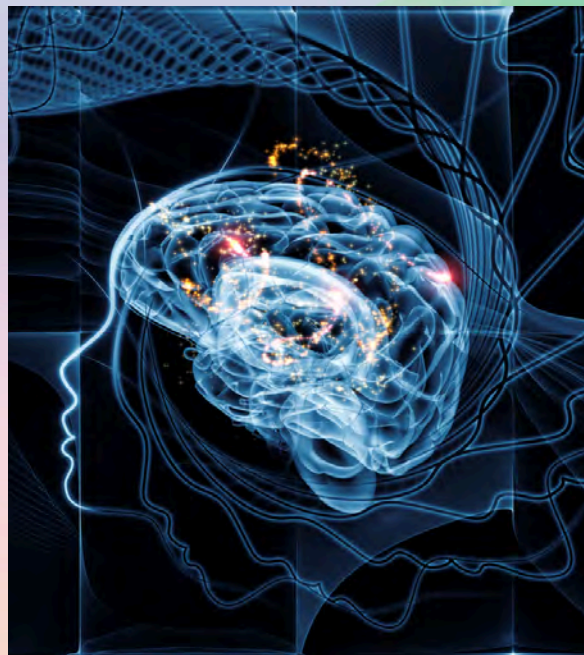
For primates, an upright thumb is not unique, but bringing our thumb across our hand to our little finger surely is unique. It's due to the size of our thumb being comparatively bigger. Which helps us with a firm grip to hold, manipulate, and move objects, not to forget to write. According to BBC News, fire is the most important aspect of evolution for human dominance. Around 1 million years ago, humans started using fire, which makes food easy to chew, keeps our predators at a distance, and helps us stay warm. It may sound strange, but according to the Live Science newsletter, blushing is also one of the reasons that helped us evolve, as it shows our knowledge and vulnerability to be emotionally intelligent.

Parenting is a heavy word, and human parents are the only parents who take care of their children for the longest. We take twice as much time as our closest relative chimpanzees to be mature. The size of our brain is very large and the number of cortical neurons present is much larger. Humans have the 2nd largest brain after sperm whales.

What we are now is not only because of the genes we gained but also due to the genes we lost in the process. Digging deep into the molecular fossils of the non-coding chromosomes, we came to know about the genes lost. REMINDER to include citrus fruits in your diet before it's too late because that's what our ancestors did. Around 61 million years ago, we lost a gene called *Gulop* on our 8th chromosome was proven to code for vitamin C. Our very far relative *Femur* can still make Vitamin C in their own body. As we are still alive and healthy, not producing it doesn't affect the proper functioning of our body; we can get plenty of it from fruits.

Around 17 million years ago, we lost a gene UoX present on chromosome 1, which codes for uricase that breaks uric acid still found in some birds. It is to be said that winters were very cold around that era and it was creating obstacles in the storage of fats in the body, which we needed for both staying warm and storing food. Therefore, losing it is a gain for us, but Gout disease due to the accumulation of uric acid is the side effect of its loss we have to face now.

Since childhood, we have known that bitter means toxic. In the past, people identified food toxicity by tasting it therefore, they have well-developed taste buds for bitter taste but with the power of speaking and sharing information eventually bitter taste buds become vestigial, leading to the loss of 11 bitter taste buds. As we know, Around 90% of our genes don't code; that becomes pseudocode which when studied properly can give so much information about early Humans.




Source: Canva photos

In conclusion, the intricate features that characterize humans have evolved over millions of years, shaping us into the beings we are today. From the development of language and vocal capabilities to the advantages of an upright posture and opposable thumbs, each adaptation has played a crucial role in our survival and dominance. Fire, blushing, and extended parental care have also contributed to our evolutionary success. Furthermore, the loss of certain genes, revealed through molecular fossils, highlights the complexity of our genetic history. As we reflect on our evolutionary journey, it becomes clear that our ability to adapt, communicate, and learn from the past has been instrumental in shaping the remarkable species we have become.


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NISHTHA BHATNAGAR
B.Sc. Life Science
II Year



Unjumble The Jumble

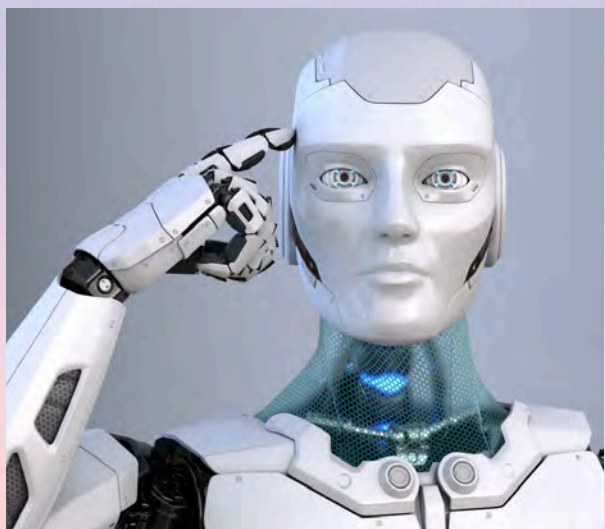


1) T E Y C O N O A C H
(hint:- they maintain the flow of water through the body in sponges)

2) L L I T I E F D A R O R B
(hint:- a medical device that uses electric shocks to restore normal heartbeat)

XENOBOTS:

Pioneering Innovations in Self-Replicating Living Robots



Source: Canva photos

Have you ever imagined a world where microscopic living robots, crafted from frog cells, could revolutionize medicine and environmental cleanup? If not, brace yourself for a journey into the realm of xenobots – the pioneering self-replicating living robots that are reshaping the future of technology and biology.

In a groundbreaking collaboration between researchers from the University of Vermont (UVM) and Tufts University in 2020, a revolutionary leap was made in the realm of robotics with the creation of “Xenobots” – the world’s inaugural self-replicating living robots. Diverging from conventional animal and plant reproduction methods, xenobots are bio-machines meticulously fashioned from the skin and cardiac stem cells of the African frog *Xenopus laevis*.

The research journey embarked upon the application of an evolutionary algorithm, harnessed by the university’s advanced computing cluster, to design these synthetic life forms. With surgical precision, individual *Xenopus* stem cells were delicately assembled into predefined shapes using minuscule forceps and electrodes. Functioning for up to two weeks, the resultant xenobots drew upon embryonic energy stores for sustenance.

Remarkably, the researchers unearthed a previously unseen trait in xenobots – the ability to reproduce by gathering loose stem cells. Compressed into miniature “babies,” these cells were released from the Pac-Man-shaped mouths of the parent xenobots. This groundbreaking capacity opens new frontiers in regenerative medicine, offering potential solutions for traumatic injuries, cancer, aging, and birth defects.

Measuring less than a millimeter in width, xenobots exhibit extraordinary capabilities such as movement, group coordination, and self-healing. Their diminutive size positions them as ideal candidates for navigation within the human body, heralding a new era of medical applications.

Beyond the realm of medicine, the research team envisions a myriad of applications for xenobots, ranging from collecting microplastics in waterways to detecting radioactive contaminants. Future iterations may see the incorporation of nervous systems, blood vessels, and reproductive components, expanding the role of xenobots beyond mere machinery.

The researchers foresee pushing the boundaries of xenobot technology to precision drug delivery within the human body, potentially addressing issues like clearing arterial plaque or detecting cancer. The prospect of utilizing a patient’s cells to create xenobots presents a novel approach to personalized medicine.

While xenobots are technically alive, they rely on external assistance for survival and replication. Their ability to move, coordinate, and self-heal represents a pioneering step in understanding how to control anatomy on demand. As research advances, the team aims to develop xenobots capable of carrying payloads, delivering medications deep within the human body without triggering immune responses, thereby further expanding the horizons of this groundbreaking technology.

However, with every stride in innovation comes a consideration of potential risks. Xenobots, though holding immense promise, introduce concerns in several domains.

Environmental and Ecological Impact: Envisioned for pollution cleanup in oceans, xenobots may inadvertently disrupt natural ecosystems and harm organisms within those environments. There is a risk of consumption by different species or causing damage to unfamiliar species due to their self-replication capability, potentially leading to invasive species concerns.

Manipulation and Malicious Exploitation: As programmable organisms, xenobots could be directed to perform tasks for harmful purposes, raising the specter of malicious use. They might be created to target bodily functions or deliver harmful substances, presenting potential threats in criminal or warfare scenarios.

Ethical Considerations: Despite lacking a brain, xenobots, derived from living cells, exhibit autonomous behaviors, prompting ethical questions about boundaries and rights associated with their use. Future developments, including nervous systems and sensory capabilities, complicate the ethical implications of employing these organisms.

In conclusion, the journey into xenobotics is a testament to human ingenuity, with immense potential for positive impact in medicine and beyond. Yet, careful consideration and ethical oversight are crucial as we navigate the uncharted territories of creating and deploying these self-replicating living robots.

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NAIYA CHAUHAN
B.Sc. Life Science
Passout- 2020-23



Unjumble The Jumble



1) E R O E R P A D M

(hint:- corals having calcareous skeleton aggregations of which form reefs and islands)

2) X R E Y E O A P C H A R T

(hint:- missing link between reptiles and birds)

NEUROTRANSMITTERS UNVEILED: ARCHITECTS OF MIND AND MOOD

Delve into the labyrinth of the human brain, where neurotransmitters reign supreme as the silent architects orchestrating the symphony of our mental and emotional experiences. Among these molecular messengers, serotonin, dopamine, GABA, and norepinephrine stand out as key players in crafting the delicate balance that defines our minds and moods.

Serotonin: Crafting Emotional Equilibrium

Serotonin, often hailed as the "feel-good" neurotransmitter, emerges as the maestro orchestrating emotional equilibrium. Its influence on mood regulation paints a canvas of emotional well-being. Yet, serotonin's role transcends the emotional realm, as it transforms into a precursor to melatonin, the sleep-regulating hormone. The delicate dance of serotonin not only shapes our emotional landscape but also guides the delicate transition between wakefulness and rest.



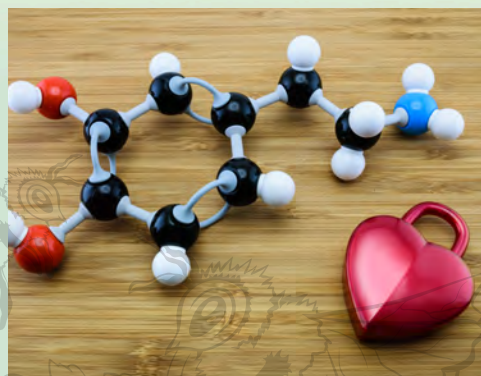
Source: Canva photos

GABA: The Serene Guardian

Step into the serene realm of GABA, the calming force within the neural landscape. As the primary inhibitory neurotransmitter, GABA assumes the role of a guardian, countering excitatory influences and ensuring neural equilibrium. Its soothing enchantment goes beyond inhibitory actions, offering a gentle touch that maintains cognitive balance. GABA, the pacifier, plays a crucial role in cultivating tranquility amidst the neural symphony, enhancing the overall mental harmony.

Norepinephrine: Catalyst for Alertness and Intensity

Feel the heartbeat quicken with norepinephrine, the catalyst for arousal and intensity. Engaged in the body's "fight or flight" response, norepinephrine ensures heightened alertness in the face of stress. Its influence on mood regulation adds a dynamic vibrancy to the emotional spectrum, creating a nuanced blend ranging from excitement to anxiety. Norepinephrine, the catalyst, shapes emotional intensity, infusing each experience with an invigorating pulse.



Source: Canva photos

Dopamine: A Maestro of Pleasure and Motivation

Dopamine takes center stage in the brain's reward system, a maestro conducting the symphony of pleasure and motivation. Its impact on pleasure reinforces behaviors linked with reward, becoming the driving force that fuels our pursuit of goals. The dopamine-driven dance is not just about pleasure; it's a motivational guide, turning aspirations into action. The intricate interplay of dopamine paints a vibrant tapestry of human experiences, where pleasure and purpose intertwine in a harmonious blend.

CONCLUSION: Interplay of Neurotransmitters represent the true magic which unfolds in the interactions between neurotransmitters. Picture serotonin, dopamine, norepinephrine, and GABA converging and diverging, therefore crafting a harmonious blend that defines the kaleidoscope of

human emotions. Molecular imaging techniques and empirical research merge to paint a vivid portrait of this enchanting interplay. The intricate dance of these neurotransmitters shape the symphonic masterpiece that is the 'human experience', where the delicate balance of each contributes to the richness and complexity of our mental and emotional lives.

As architects of mind and mood, these neurotransmitters, though silent, wield profound influence over our mental well-being. Their intricate dance, finely tuned and balanced, shapes the essence of the human experience. Understanding this symphony allows us to appreciate the delicate interplay within our brains, unlocking doors to potential therapeutic interventions and enhancing our grasp on the complex beauty of the mind.

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SHREYANSHEE VAIDYA
B.Sc. (Hons.) Zoology
I Year



Unjumble The Jumble



1) E T R O U I C A I O N T H P

(hint:- aging of water bodies)

2) T O N I U P H E Y N E L R A K

(hint:- an inheritable disorder that increases the level of phenylalanine in blood)

A LIFE WITHOUT ANY PAIN

Sometimes, I feel so grateful to the almighty creator who has sent so many beautiful creations on Earth. Every element, be it biotic or abiotic, is carved in the most beautiful and organized way. Each creature has been given specific features which make them different from others. We humans have been intricately designed with specialized organs, each serving distinct functions necessary for physiological processes.

We possess developed sensory capabilities, blessed with sharp senses which perceive stimulation and our body responds accordingly. One of the senses that I find interesting is 'pain'. Pain is such a feeling that no one would likely want to bear. Even, a little child fears getting hurt.

How would it be if we become insensitive to pain? A doubt may arise regarding the existence of such a being who is incapable of perceiving the noxious stimuli of pain but believe me they do exist.

One such condition is found in the patients suffering from CIPA, that is Congenital Insensitivity to Pain and Anhidrosis. It is also known as "hereditary sensory and autonomic neuropathy type IV" (HSAN-IV). Mostly, off-springs of consanguineous couples suffer from this autosomal recessive disorder. Consanguineous couple refers to the parents who are blood related or have descended from the same ancestor.

This condition is caused due to mutation in the NTRK1 (Neurotrophic Receptor Tyrosine Kinase 1) gene. "NTRK1 gene is responsible for the production of a protein which is crucial for the growth and viability of nerve cells. Such nerve cells mostly transmit sensory information like pain, temperature and touch." As a result, sensory and autonomic nerves fail to develop.

This hereditary disorder is very rare and the affected individual shows symptoms like fever, hyperthermia (unusual rise in body temperature), inability to sweat (anhidrosis), loss of pain sensitivity and mental retardation to some extent in a few cases. In this condition, it is found that the patient has a tendency to harm and cause injury to himself or herself (self mutilation). Toddlers usually tend to bite with the help of their new primary teeth. The affected toddlers in such condition injure their fingers, lips and tongue and cause dental injury unintentionally as they cannot feel pain. It is found that they also have fractures, eye injury, Charcot neuroarthropathy (loss of sensation in foot and ankle), dislocation of bones and other joint deformities which leads to infection in joint tissues and associated bones. Symptoms of hyperactivity, irritability and mood swings have been observed.

Swanson explained CIPA in 196. First such clinical case was reported in Iran where a 2.5 year old boy was diagnosed with CIPA. He showed similar symptoms along with hyperkeratotic hand eczema (thick scaling on palms).

It is found that "20% of the CIPA patients die within 3 years of life". Their average lifespan is around 25 years. There is no cure. The patient ceases to exist without knowing the actual reason or cause behind his or her death as there are several. Prenatal screening can prevent birth of an affected child. CIPA patients must undergo regular body checkup, especially visual and eye follow up and specific dental care.



Source: Canva photos

Affected individual must get treatment to avoid further complications as cause or reason for his/her death might be several. Prenatal screening can prevent birth of an affected child. CIPA patients must undergo regular body checkup, especially visual and eye follow up and specific dental care. Affected individual must get treatment to avoid further complications.

It is very essential to monitor the body's temperature regularly and stay careful. Prevention is always better than cure. Pain might not be a comfortable sensation but without it, we can barely live. Pain acts as a signal that alerts us if there is any health issue within our body. A doctor can treat his patients when he is aware of the symptoms and can do the needful to get the treatment done.


Ovid, the famous Roman poet quoted the phrase -
"Perfer et obdura, dolor hic tibi proderit olim"

This phrase highlights the value of enduring the pain faced in the present moment which will eventually serve a purpose in the future and will make positive contributions to someone's life.

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SWASTIKA DEY
B.Sc. Life Science
II Year



Unjumble The Jumble

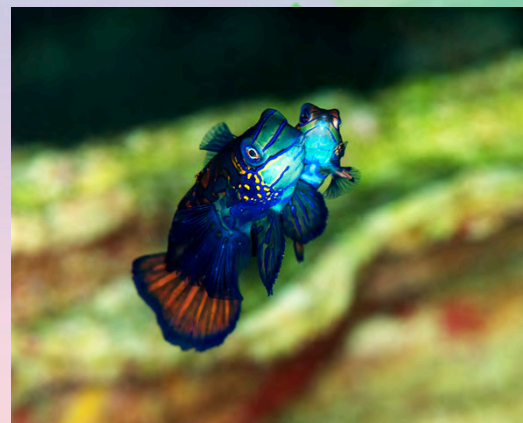
1) P T E R S U O R O T P
(hints:- a type of lung fish)

2) E M O R R E S A C
(hint:- functional unit of muscle)

TALES OF LOVE FROM DEEP SEA : MATING RITUALS

It is well known that each and every organism want to mate, reproduce so that their genes are passed on to the generations, be it a small virus to large animals like we humans. So in this article let's see how the different marine animals have unique mating techniques.

Let's first look at puffer fish mating rituals; it creates some fascinating structures to attract their mate. Puffer fish is scientifically known as *Tetraodontidae*. The fish is only 10-12 cm long but the circles they make are almost 2 meters in diameter. It takes 7-9 days for the male to construct those patterns. Males flap their fins while swimming along the seafloor and create circles using their belly.



Source: Canva photos

The outer ring consists of irregular mountains and ridges while the center is smooth and fine sediments. The center is formed by inside to outside or outside to inside movement and its anal fin helps to create the irregular patterns. It keeps on improving the patterns until a female is ready to choose it as its mate. Puffer fish generally shows female mate choice while there is mating. The female selects the male based on the quality of the nest he creates, patterns, size and color of the nest. When the female comes to inspect the nest the male stir up the sand of the center circle to show her the quality of the nest for laying eggs. Once a mate has been chosen, male and female spawn by pressing each other's body and vibrating which releases gametes. After mating the female leaves the nest and the male stays and looks after the egg and chases off the predators to protect the young ones.

The egg will hatch in about 4-5 days. During this time the nest deteriorates as the male doesn't maintain it and leaves the nest once the egg hatches and never comes back to the same nest they spawn earlier.

Now let's see another marine fish Anglerfish showing a very different type of mating technique where the male and female show symbiotic association or sexual parasitism for mating and survival. By listening to the name anglerfish we just imagine their big mouth, scary teeth and antennae like structure protruding from their head which is bioluminescent. But there is something beyond this, while studying about them scientists have noticed that all the fish they are studying are female, so where has the male gone? The answer to this is that the male attaches itself to the female's belly as the males are born without a digestive system thus they soon after birth search for a female mate and attach themselves for survival. When it attaches itself the skin and blood vessels fuse together, thus allowing the male to take the nutrients from the female and they become a single organism. When the male body is attached to a female some of the organs get degenerated like teeth, eyes and fins. The male in turn provides the female with sperms for spawning. This type of mating is really very fascinating and unique on its own.

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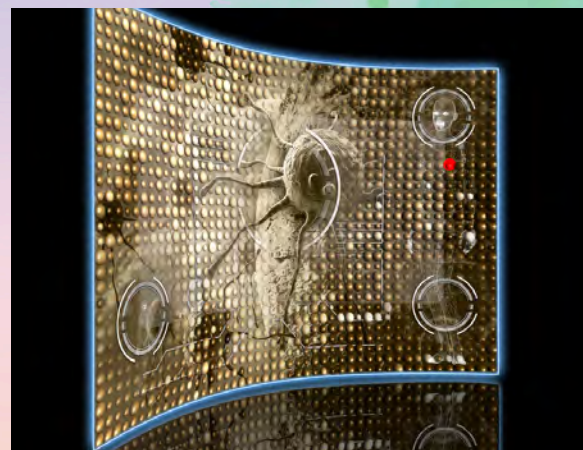
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PRIYANKA BISWAS
B.Sc. (Hons.) Zoology
III Year

REVOLUTIONIZING CANCER DIAGNOSIS: ROLE OF NANOTECHNOLOGY IN CANCER DETECTION

In the sphere of medical science, nanotechnology has become a ground-breaking frontier, especially in the diagnosis of cancer. Owing to the nanoscale operation of this revolutionary technology, precise manipulation and interaction with biological entities are made possible. Nanotechnology provides a plethora of novel methods for cancer detection that promise earlier and more accurate diagnoses, leading to better patient outcomes.

The creation of nanoscale imaging agents is one of the main ways through which nanotechnology is being used to diagnose cancer. These minuscule particles, which are frequently composed of gold or quantum dots, have the ability to bind to cancer cells only.



Source: Canva photos

These imaging agents improve contrast in imaging modalities including computed tomography (CT) scans and magnetic resonance imaging (MRI) when injected into the body. Because of this increased sensitivity, medical practitioners can identify tumors in their earlier stages, when treatment options are typically more successful. Furthermore, the science of molecular diagnostics greatly benefits from nanotechnology. It is possible to design nanoscale probes to specifically target biomarkers linked to certain cancer types. Through the utilization of the distinct characteristics of nanomaterials, these probes aid in the recognition of molecular markers suggestive of malignant cells. This method improves the precision of diagnostic testing and allows treatment regimens to be tailored to the unique genetic features of each patient's cancer.

Liquid biopsy procedures have been made possible by nanotechnology, in addition to imaging and molecular diagnostics. These provide a non-invasive substitute for conventional tissue biopsies by analyzing circulating tumor cells or nucleic acids in the blood. The identification and separation of minuscule amounts of cancer-related biomarkers is made possible by nanoscale sensors and devices, which offers valuable insights about how the illness develops and responds to therapy.

Biosensors represent another important area where nanotechnology has helped in cancer diagnosis. It is possible to create nanoscale devices with chemical or biological receptors that can identify particular chemicals linked to cancer. These biosensors can be included into a wide range of diagnostic instruments, from portable point-of-care testers to complex lab apparatus. The capacity to promptly and precisely detect biomarkers associated with cancer improves early detection and enables prompt action. Additionally, nanoparticles are essential for improving the performance of conventional imaging and diagnostic techniques. For example, nanomaterial-based contrast agents can enhance the resolution of imaging modalities, enabling more accurate tumor localization. Furthermore, combining the use of nanoparticles with additional diagnostic methods like ultrasound or positron emission tomography (PET) adds to a thorough and multimodal approach to cancer diagnosis.

Beyond biomarker identification and diagnostic imaging, nanotechnology has sparked the creation of novel therapeutic strategies. Therapeutic medicines can be directly delivered to cancer cells using nanoparticle engineering, reducing harm to healthy organs. Besides improving treatment efficacy, this focused medication delivery lessens negative effects related to traditional chemotherapy.

In its entirety, the application of nanotechnology to cancer diagnostics marks a revolutionary development in medical research. Nanotechnology provides a wide range of methods to improve early diagnosis and individualized treatment plans, from enhancing imaging capabilities to providing precise molecular diagnostics. Nanotechnology is poised to revolutionize cancer diagnostics and give hope for more patient-centered and successful approaches to battling this pervasive disease as research into its full potential continues.

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VAISHNAVI RAJAGOPALAN
B.Sc. (Hons.) Zoology
III Year



Unjumble The Jumble



1) KOLIREICMIOPHT

(hint:- having a body temperature that varies with the temperature of surrounding)

2) SAGOISENSIONT

(hint:- refers to narrowing of blood vessels)



THE MICROCOSMOS

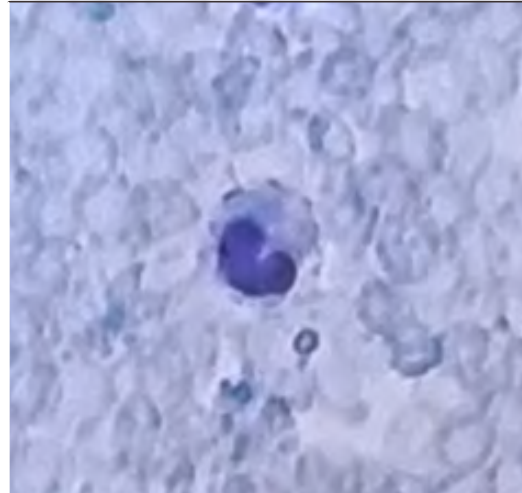
In the depths of glass, a world unseen, microscopic wonders, a vast machine,
A lens reveals what eyes cannot see, a hidden realm of complexity.

Polytene chromosomes in *Chironomus*



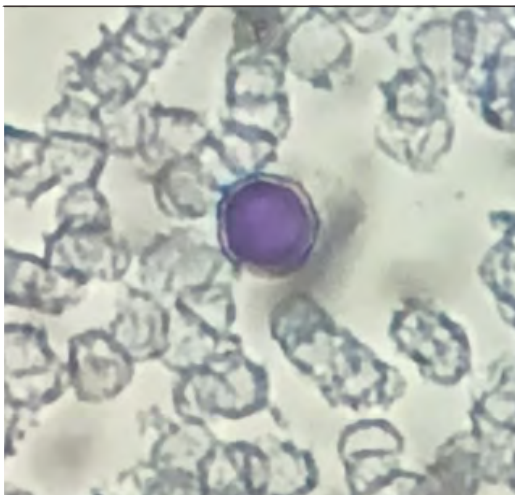
Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year

Monocyte in human blood smear



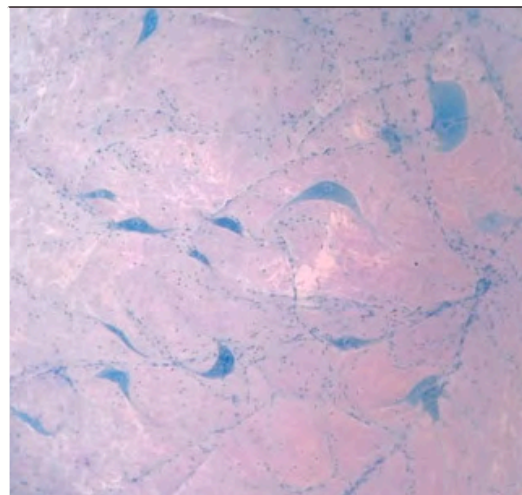
Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year

Lymphocyte in human blood smear



Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year

Goat neurons and neuroglia



Khushi Kumari
B.Sc. (Hons.) Zoology
II Year

In the quiet hum of laboratory's lair, where curious minds venture, seeking to dare,
Stands a marvel of science so grand, a tool of exploration in scientist's hand.

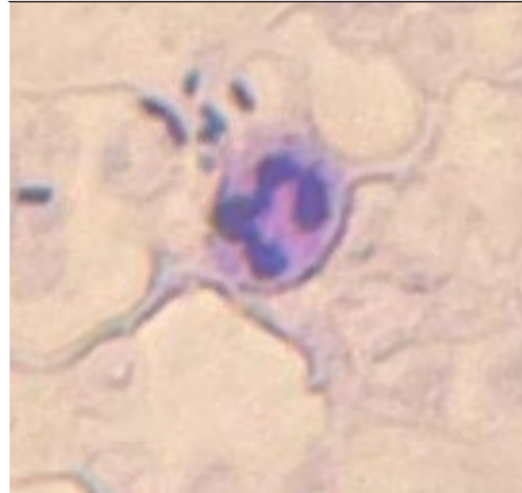
In the depths of glass, a world unseen, microscopic wonders, a vast machine,
A lens reveals what eyes cannot see, a hidden realm of complexity.

Drosophila egg with four appendages



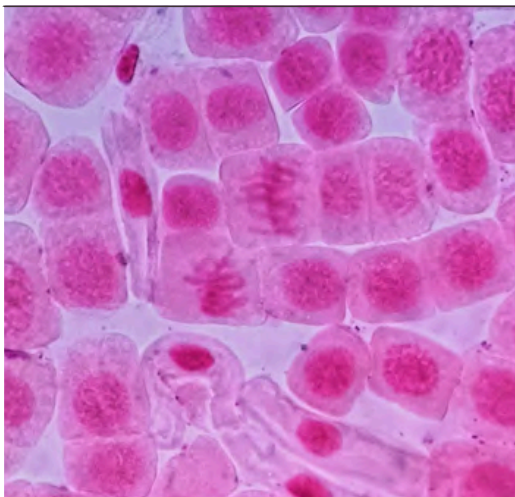
Soniya
B.Sc. (Hons.) Zoology
III Year

Neutrophil in human blood smear



Dishita Jain
B.Sc. Life Science
III Year

Mitotic stages in onion root tip



Soniya
B.Sc. (Hons.) Zoology
III Year

Female and male *Drosophila*



Soniya
B.Sc. (Hons.) Zoology
III Year

In the quiet hum of laboratory's lair, where curious minds venture, seeking to dare,
Stands a marvel of science so grand, a tool of exploration in scientist's hand.



MELODIES & DICTION

WHISPERS ACROSS SYNAPSES: A NEUROCHEMICAL BALLET

In the realm of thought, where neurons reign
A delicate dance of molecules sustain
The sparks that fire, the currents that flow
Are governed by laws we still don't know

But one thing is clear, as day breaks through night
The bridge between cells, a wondrous sight
The synapse, a gap so fine and narrow
Where chemical messengers come to ponder

Acetylcholine and dopamine, they meet
To exchange secrets, sealed in a treat
Serotonin and norepinephrine, too
Join in the fray, their roles anew

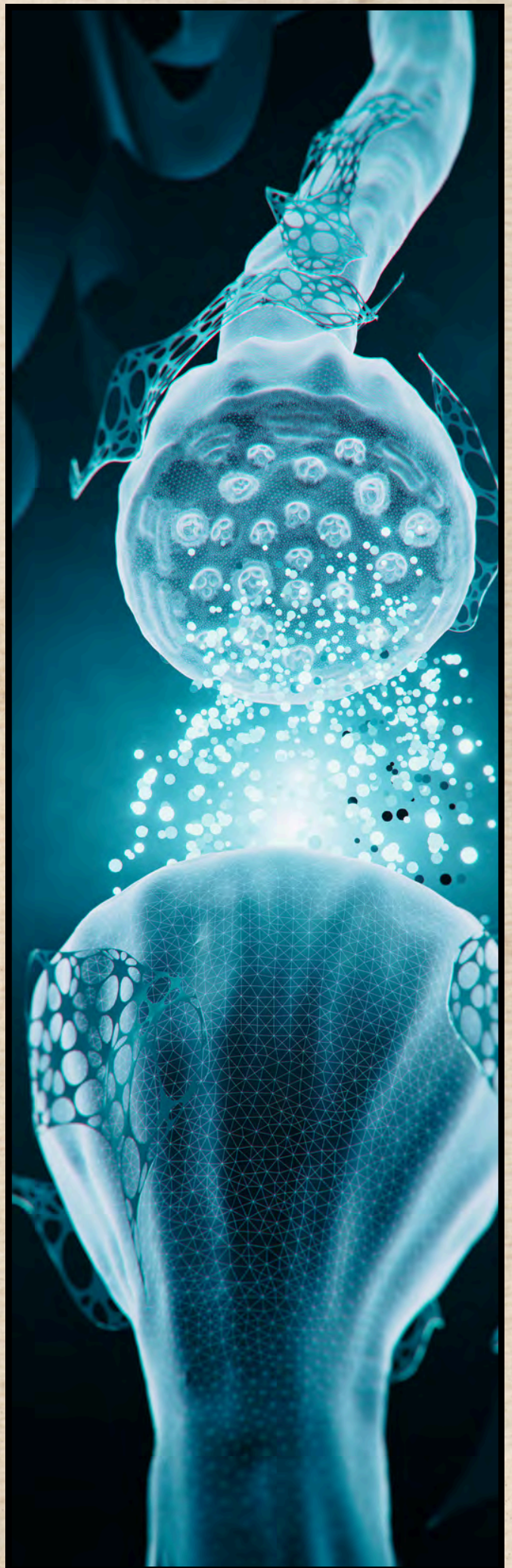
GABA and glutamate, opposites collide
Yet together they keep the balance inside
Neurotransmitters all, each one unique
Together they form the neural sleight

Oh, how intricate this web of mind
Where bridges forge connections, intertwined
Neurons talk to each other, nonstop
In this language of chemistry, they hop

Oxytocin and endorphins, feel-good friends
Elevating moods that never end
Dopamine rushes, pleasure unfolds
Memories made, learning takes hold

So here we find the key to thought
In these tiny spaces, our brains are brought
Bridging the synapses, we connect the dots
And unlock the mysteries of what we've got.

Hitaishi Chawla
B.Sc. Life Science
II Year



SONG OF 'DNA SEQUENCE'

Strings of those four letters
Layout of unique patterns
A, T, G, C going on,
Sequence can be short or long

Masked genes as musical notes
To find what each denotes
Assigning function to the genes
Knowing them by various means

Proteins which they synthesize
Or RNAs which are transcribed
Protein families which they belong
In which metabolism going along

Annotation is the real task
Depends on what question you ask
'omic' tools all it takes
Finding the 'sense' sequence makes

Central dogma with 'omics' cascade
Genomics, transcriptomics, proteomics aid
Unmasking the secrets of cell
Untold stories to tell

New drugs and crops improve
Disease diagnosis and health improve
Finds ways for POPs to be removed
List is widening day by day
Newer tools on our way

Need to embrace biology in silico
Augments the efforts in vitro in vivo
softwares and databases help along
To listen to the sequence song

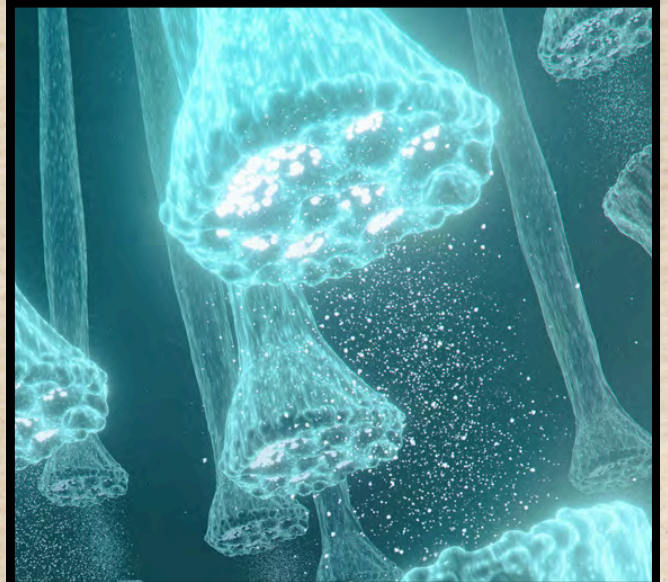
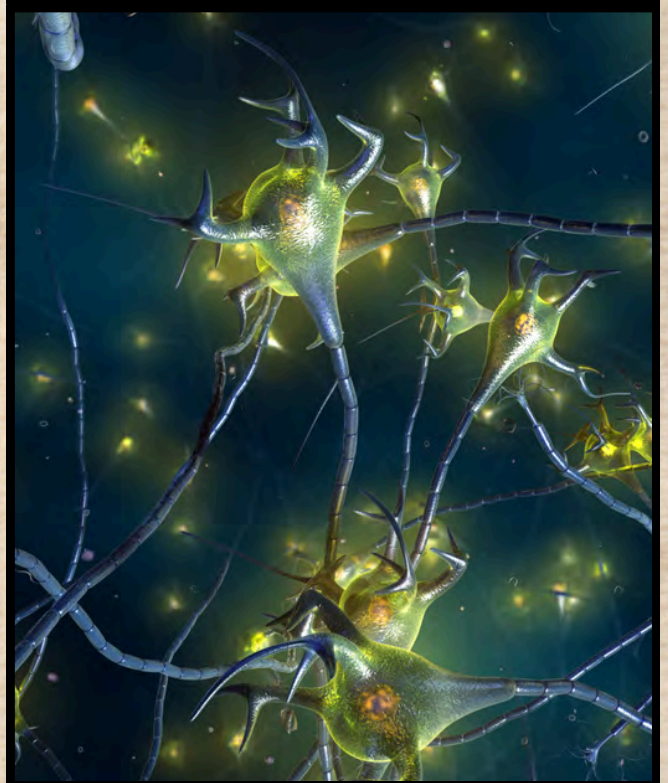
Dr. Jaspreet Kaur
Assistant Professor
Zoology Department



THE BRAIN BUZZ

In a huge terrain of gray grooves,
Of the brain, a prodigy, ideas move.
Neuronal dance, a synaptic waltz,
Ideas bloom like a spring salt.
Consciousness buzzes in frenzy ways,
Harmonious thoughts a great ballet.
Electricity, flicker ignites,
in the maze of brain so bright.
The cosmos inside, hunches unfurl,
In the tap of creativity, inklings whirl.
Memories imprinted on the neuron's thread,
In the mix of mind, the mysteries spread.
Enigmatic circuit, thoughts cascade,
In the pockets of brain ideas pave.
A hidden realm, where visions take flight,
The rhythm of brain has possibilities infinite.

Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year



Source: Canva photos

SERENE AQUATIC PARADISE

The world beneath our eyes,
Dancing silently in the watery paradise,
Shiny fins and glossy scales,
An amazing scene within the aquatic tales.
Ballet in the silver gleams,
Appears as a splendid dream.
As beautiful as the white light
splits through prism,
The waves still and the colors rhythm.
Fishes frolic under the sea in unison,
A musical waltz with a tail
In the poetry of the sea, shine the aquatic
denizens.

Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year



आशा का दामन

मन में बहुत निराशा थी
जब कोई न था सिर्फ आशा थी
दिल में जगी एक अभिलाषा थी ।
जब आँख भरे थे अशको से
तब नभ भरे थे, तारों से
हर रात जगी, हर बात चुभी
दिल रोया, मैं भी रोयी।
जब टूटती उम्मीदों की लारी थी,
जो सामने असफलता खड़ी थी,
जब कोई न था सुनने वाला ,घावों को भरने वाला
तब रोम रोम मेरा काँप उठा,
दीवारे भी चींखी, उम्मीदें भी टूटी
दुःख क बादल छाए थे,असफलता के साए थे,
हम स्वयं को संभाल न पाए थे, हिम्मत न जुटाए थे
मैं आह भरी, मैं सिसक उठी,
दिल रोया मैं भी रोई
जीवन अँधेरे में था, वह वश मैं मेरे न था,
तब आसूँ मेरे सुख गए, होठ मेरे सिल गए,
मैं मौन हो गई गम के अँधेरे में,
फिर.....
दिन बदला, बदली बातें.....
उम्मीदें जागी, उठी उमंगें
वाही सूरज नव प्रभात लाया ,
खोए साहस फिर से जागे, आशा का दमन थामे
तब, मैंने दिल की बात सुनी
अपनी क्षमता को जानी पहचानी
जब मैंने अपना लक्ष्य पाया
तब मैंने खुद को पाया।

Sakshi
B.Sc. (Hons.) Zoology
III Year





ODYSSEY REFLECTIONS



NAMCHI- A HEAVEN FOR TREKKERS

Dr. Archana Aggarwal
Assistant Professor
Zoology Department

All the trips, as one might expect are not the result of an adrenaline rush and a lot of excitement. Some roads are just being taken out of duty, and so is the visit to Namchi, the capital of the district of South Sikkim. Namchi is not only a tourist spot but also a pilgrimage center. After a long train journey of almost 40 hours through sleeper class, one just needs a bed and good sleep. The stay in Namchi, the camp of the Sikkim Battalion was located in the outskirts and offered a magnificent view of Mt. Kanchenjunga. Kanchenjunga is the highest mountain peak in India and third in the world. During busy, and tiring hours, looking at the peak was the natural occurrence, and zeal to capture the best view was inevitable. During various treks, including Rangeet River, Char Dham, and Samdruptse with around 100 NCC cadets, Sampdruptse offered the best view of the much-desirable Mt. Kanchenjunga.

During the treks, one can appreciate the inner beauty of the state. The air was so fresh, the food always tasted good, and sleep was as sound as one could expect. We were fortunate to be assisted by locals, and their experience with vegetation, biodiversity, geography, weather, and culture is greatly acknowledged. Some of the students will always be remembered for making my stay pleasant. With passing days, you start enjoying the company of unknowns and then a day comes when goodbye is the only option.



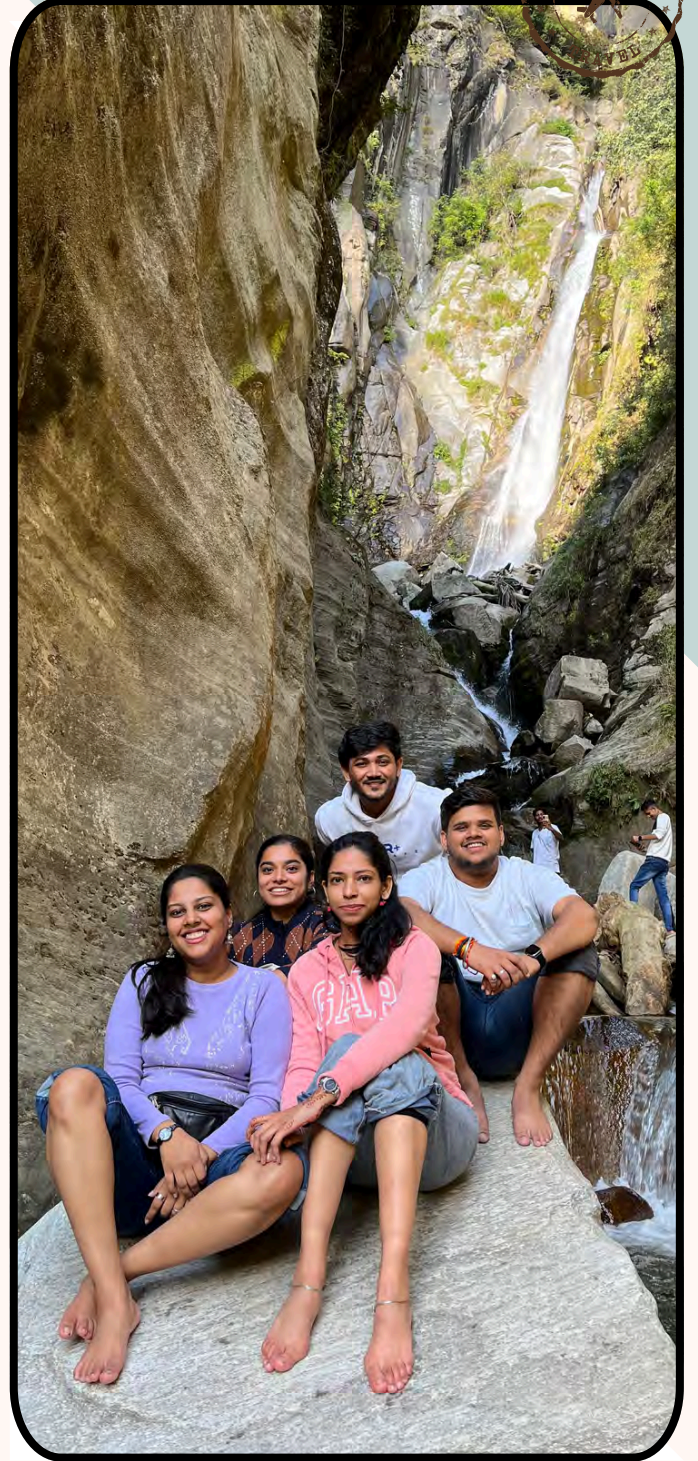
I must thank Maitreyi NCC, for allowing me to explore life with a different perspective.

DEV BHOOMI- A TRIP IMPROMPTU

Jyotsna Mishra
B.Sc. Life Science
III Year

The rendezvous began on the evening of 26th October 2023, when I was all set to impart on my first-ever trip with my friends, a memory I knew would live forever in my mind, because as it is universally accepted, wonderful paths travelled with wonderful friends only leave cherish-able memories. We were leaving for a short trip to Manali-Sissu-Atal and Kasol.

I, along with my two dearest friends, Dishita and Chahak, together took on this trip and made amazing friends from other colleges during the journey. We left Delhi around 6 p.m. in a Volvo. The air was exceptionally calm that day, or maybe it seemed so amid all the excitement that reverberated all around. We got a little delayed in reaching our destination because of the heavy evening traffic that day and reached Himachal at 8 a.m. the next morning. But it was still a two-hour journey to our hotel in Sims Village, Manali. Fast forward to noon, we set on a 3km trek to Jogini Waterfall. Located a few km away from the Vashisht Temple, Jogini Waterfall is considered a symbol of female power and is an epitome of femininity amongst the locals. It is said that Jogini Falls joins the Beas River in the Kullu Valley below and the entire area brims with spirituality and positivity. The synchronous sound of water dimmed all the noises in the surrounding, and despite the 5°C we were crazy enough to jump into the cold waters of Jogini. On the way we also clicked a few pictures with very cute rabbits.



यूं इस तरह इन बहती हवाओं ने संभाला है मुझे
मैं अपने सारे गम भुला गया, मां
यहां बहती ऐसी नदियां हैं
क्या बताऊं तुझे कैसे इस शीतलता के स्पर्श ने
सारी वेदनायो को समा लिया, मां
इसका वर्णन भी अब अपने मुख से मैं कैसे करूं, मां
मैं कैसे करूं, मां।



Next day, we got up early to leave for the snow point via Rohtang la. We stopped for a while to get our snow clothes and boots, and schedule our snow activities with the guide. A 30 minute trip via bus, we could finally see the snow wrapped roads. As it was the month of October, much snow was not expected but we still were lucky enough to see snow capped mountains and enjoy activities like yak ride, snow tube or skiing at lower ice levels. It was as if a little girl's dream had come true and everyone had connected with their inner child, because somehow nature had seemed to heal it all. The light-hearted snow fighting had connected all.

Our third day, also the last day, our hearts felt a little heavy, all ready to take the hit of nostalgia that was incoming. We followed the same ritual of waking up at the last moment and rushing to the breakfast table. Once we were satiated we headed back to our rooms and get our bags. By 9:30 a.m. we had already left for Kasol Market. Nothing like the urban hubbubs, the market boasted of its beautiful cafes, aesthetic souvenir shops, side road magic tricks and a hundred percent recommended dish 'Siddu'. A traditional Himachal dish, Siddu is a savoury and nutritious meal, filled with walnut paste.

We must say that this street snack managed to hit all the right taste buds. After that, Paragliding and rafting had been planned for the day. The water was icy cold but still a few daring ones managed to jump inside the waters. With each bump our hearts skipped a beat, but the uncertainty, fear, and the conquering it made the ride a beautiful memory.

We left for Delhi around 7 p.m., crossing the Himachal Borders at around midnight. Despite the tiredness, everyone jammed to the songs on the way back. We bid the last greetings to each other at Majnu ka Tilla, near and left for our homes.





UNRAVELING NAINITAL

Medhavi Kaushik
B.Sc. (Hons.) Zoology
II Year

On 16th February 2024, I went on a departmental trip along with my friends and professors to Nainital.

Nestled amidst the majestic peaks of the Kumaon hills in Uttarakhand, Nainital is a paradise that never fails to captivate its visitors. As I arrived in this picturesque town, I was immediately greeted by the refreshing mountain air and the breathtaking beauty of the surroundings. The town gets its name from the pristine Naini Lake, which is the centerpiece of The Nainital's charm. shimmering waters of the lake, surrounded by lush green hills, create a postcard-perfect view that leaves an everlasting impression on our souls.

As I ventured further into Nainital, I discovered that its beauty extends far beyond the captivating Naini Lake. The town is adorned with several scenic lakes, each with its own unique charm. Bhimtal, Naukuchiatal, and Sattal are some of the other lakes that offer tranquility and a chance to connect with nature. The mountains surrounding Nainital provide a breathtaking backdrop, inviting us to embark on adventurous treks and nature walks. The panoramic views from the hilltops are simply awe-inspiring, giving us a sense of how tiny we are in the grand scheme of things. During my visit to the Nainadevi Temple, I was astounded by the spiritual energy that enveloped the place. The temple is located at the end of Naini lake and offers a panoramic view of the entire lake. As I entered the temple,



I could feel a sense of calm and serenity washing over me. The melodious chants and the fragrance of incense filled the air, creating an atmosphere of devotion and peace. The temple is dedicated to Goddess Naina Devi, after whom the town is named. It is believed that a visit to this temple brings blessings and fulfills one's wishes. I felt a deep connection with the divine as I offered my prayers and soaked in the spiritual ambience.



My previous visit to Nainital was with my family, and this time, I decided to explore the town with my friends. It was interesting to observe the contrasting experiences between the two trips. While the family trip was more about bonding and creating memories, the trip with friends had a different dynamic.

We indulged in adventure sports, explored local cafes, and spent evenings by the lake, sharing stories and laughter. Both trips had their own charm, and it made me realize how versatile Nainital is, catering to different kinds of travel experiences.

A visit to the Nainital Zoo was an eye-opening experience for me. Having previously visited the Delhi Zoo, I was pleasantly surprised to witness the stark contrast in the conditions of the animals. The Nainital Zoo is smaller in size but provides a healthier and more comfortable environment for the animals. The enclosures are spacious, well-maintained, and mimic the natural habitats of the animals. It was heartening to see the animals in a happier state, free from the stress and confinement that often plagues animals in zoos. The Nainital Zoo serves as a shining example of responsible wildlife conservation.

No visit to Nainital is complete without a stroll through the vibrant Tibetan Market. The market is a treasure trove of colorful handicrafts, traditional clothing, and delicious street food. As I wandered through the narrow lanes, I was captivated by the intricate Tibetan artwork, the vibrant prayer flags fluttering in the breeze, and the aroma of momo and thukpa wafting through the air. The market offers a glimpse into the rich Tibetan culture and provides an opportunity to take home unique souvenirs that are a testament to the town's cultural diversity.

Nainital is not just a feast for the eyes but also a treat for the taste buds. The town boasts a variety of culinary delights that will leave you



craving for more. From piping hot momo and thukpa in the Tibetan Market and piping hot jalebis in local restaurants, Nainital offers a wide range of gastronomic experiences. How can I forget the famous Bal Mithai, a sweet made from roasted khoya and coated with sugar balls, which is a specialty of the region?

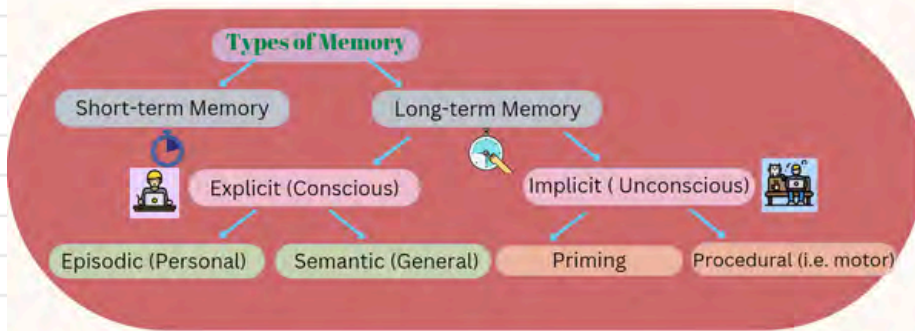
As I bid farewell to Nainital, I carried with me unforgettable memories and a renewed sense of peace. Nainital offers an escape from the chaos of everyday life, allowing us to reconnect with ourselves and nature.



ILLUSTRATIVE INSIGHTS

MEMORY ALCHEMY

Memory: faculty of encoding, storing, and retrieving information.



Regions in Brain associated with memory

Cerebellum: fine motor control

Prefrontal cortex: Verbal and spatial working memory

Basal ganglia: involved in emotion, reward processing, habit formation, movement and learning.

Neocortex: Memories stored in hippocampus are transferred here

Hippocampus: Where episodic memories are formed and indexed

Amygdala: attaches emotional significance to memories and key role in forming new memories specifically related to fear.



- **Ca(2+)/calmodulin-dependent kinase II (CaMKII):** abundant **synaptic signalling molecule**.
- It plays an important role in **synaptic tagging and metaplasticity**.
- **Neuronal functions:** modulation of ion channel activity, cellular transport, neurotransmitter synthesis, neurotransmitter release, cell morphology and neurite extension, synaptic plasticity, gene expression, learning, and memory.
- It triggers the molecular basis of **learning and memory**.

Long Term Potentiation

- Long-term potentiation (LTP) is a way of **enhancing communication** between brain cells that **helps us learn and remember**.
- It occurs when **repeated stimulation of a synapse** makes it **more responsive and efficient for future signals**.
- It is a **key cellular model** for studying the molecular and genetic basis of learning and memory, as well as the disorders that affect them.
- Carried out by the neurotransmitter **glutamate**.



Brain Foods

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- Graphics: Canva & Flaticon

Khushi Prajapati
B.Sc. (Hons.) Zoology
III Year

PARKINSON'S DISEASE

the tremor creator!

● neurodegenerative disorder



WHAT IS PARKINSON'S DISEASE?

- It is a progressive disorder caused by degeneration of nerve cells in the substantia nigra part of the brain, which controls movements.
- The nerve cells die or become impaired, losing the ability to produce an important chemical called dopamine.



SYMPTOMS

- Tremors and involuntary rhythmic movements of the hands, arms, legs and jaw.
- Muscle rigidity in arms, shoulders and neck
- Gradual loss of spontaneous movement leading to decreased mental skill, reaction time, facial expressions
- Unsteady walk and balance
- Depression and Dementia
- Loss of smell



CAUSES AND RISK FACTORS

There is no one definitive cause of Parkinson's disease. It can be due to blend of the following-

- Commonly develops after the age of 60 years
- Genetic history of Parkinson's disease in family.
- Exposure to certain environmental toxins
- Head injury
- Men are more likely to develop Parkinson's disease.



DIAGNOSIS

- Motor tests- for motor symptoms
- Levodopa test- to check the effect of this medication in alleviating the symptoms of the disease
- Smell tests- to check loss of smell
- Dopamine transporter scan- to evaluate the amount of dopamine-producing nerve cells in the brain
- Cognitive tests- to assess thinking, memory and executive function.
- Alpha-synuclein tests- to detect clumps of alpha-synuclein protein, a hallmark of the disease.
- Genetic tests- to check if the person carries any Parkinson's disease related mutation.



TREATMENT

Currently, there is no cure for this disease, however, symptoms can be managed by-

- Levodopa
- Dopamine agonists
- Dopamine metabolism blockers
- Levodopa metabolism blockers
- Adenosine blockers
- Deep brain stimulation
- Stem cell transplants
- Neuron-repair treatments
- Gene therapies and gene-targeted treatments



PREVENTION

- Healthy diet rich in omega-3-fatty acids and vitamin D3.
- Regular aerobic exercises
- Reducing stress

REFERENCES:

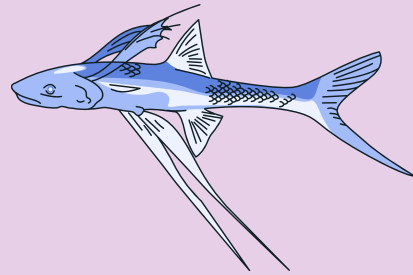
- <https://my.clevelandclinic.org/health/diseases/8525-parkinsons-disease-an-overview>
- <https://www.mayoclinic.org/diseases-conditions/parkinsons-disease/symptoms-causes/syc-20376055>
- <https://parkinsonsnewstoday.com/parkinsons-disease-tests-diagnosis/>

Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year

War of Reproduction

TRIPOD FISH

The tripod fish walk around the bottom of the ocean floor on their three fins looking for a partner to reproduce with. If they can't find a partner, which is almost always as the ocean floor is giant and completely dark, they reproduce with themselves as they are hermaphrodites.

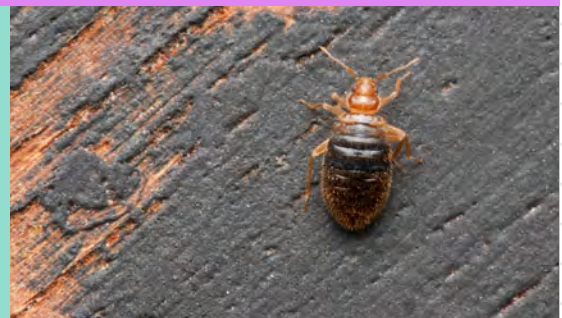


BANANA SLUG

Banana slugs which are hermaphrodites can be 6-8 inches and their erect penis can be just as long. In addition, their penises emerge from their heads. After mating, banana slugs eat each other's penises.

BED BUG

Male bed bugs have sharp needle-like penises, which they use to stab the female bed bugs right in the stomach, even though they have a vagina. Sperm is injected directly into the bloodstream, which isn't even where it needs to go. They have been observed to even stab other males. Both genders have evolved "false vaginas" in the middle of their abdomens to make this fun hobby less painful.



JEWEL BEETLES

Australian jewel beetles are threatened because they try to have sex with beer bottles that look/feel like the female Australian jewel beetle and they subsequently die of sun exposure.

PRAYING MANTIS

Immediately after sexual intercourse, a female praying mantis will rotate her head 180° and eat the head of the male. Therefore male praying mantis has an extra "brain" in its rear, which controls the necessary motions for copulation, so it can continue mating after the female has eaten his head.



REFERENCES:

- <https://www.science.org/content/article/bedbugs-extraordinary-penis>
- <https://factrepublic.com/40-terrifying-facts-about-animals/3/>
- Image source: Canva photos

Soniya

**B.Sc. (Hons.) Zoology
III Year**

Pioneering Perspectives: Scientist Spotlight

Scientists, the intrepid seekers of truth, venture into the unknown, wielding curiosity as their compass and imagination as their guide. With every experiment, they breathe life into the silent whispers of nature, revealing its secrets with unwavering resolve. Their pursuit is not merely for knowledge but for the enlightenment of humanity, for they understand that within the depths of the cosmos lies the key to our collective destiny. In their quest, they redefine possibility, sculpting the future with the steady hands of innovation and the boundless spirit of discovery.

Rita Levi-Montalcini

A famous Italian neurologist, received widespread praise for her pioneering discovery of nerve growth factor (NGF), which marked a watershed moment in neurobiology research. Her significant contributions to the scientific community resulted in the coveted Nobel Prize in Physiology or Medicine in 1986, which recognized her essential work on the identification and understanding of growth factors. Levi-Montalcini's discovery of the intricate mechanisms underlying neural development and regeneration transformed our understanding of how nerve cells communicate and grow, paving the way for significant advances in neuroscience and potential therapeutic interventions for neurological disorders. Her pioneering work continues to inspire and lead generations of academics as they strive tirelessly to solve the secrets of the human neurological system.

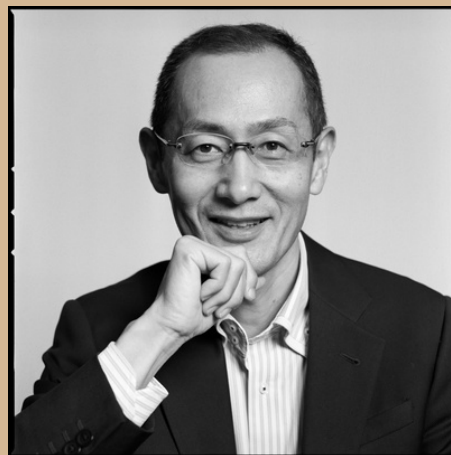


Jennifer Doudna and Emmanuelle Charpentier

Jennifer Doudna and Emmanuelle Charpentier are renowned scientists who co-led the pioneering invention of CRISPR-Cas9 gene editing technology, a historic breakthrough that has irreversibly changed the areas of genetic engineering and molecular biology. This innovative technology has not only enabled remarkable advances in genome editing capabilities, but it has also expanded the scope of scientific study and medical applications. Their outstanding contributions to the scientific community were recognized when they were jointly given the coveted Nobel Prize in Chemistry in 2020, cementing their reputation as pioneers in genetic modification and molecular biology.

Shinya Yamanaka

Shinya Yamanaka is a well-known pioneer in the fields of regenerative medicine and cellular reprogramming thanks to his landmark discovery of induced pluripotent stem cells (iPSCs). iPSCs are adult cells that can be reprogrammed to have properties comparable to embryonic stem cells, making them extremely promising in a variety of applications such as regenerative medicine and disease modeling. This groundbreaking research not only changed the way scientists think about cell biology, but it also paved the path for novel medical treatments and tailored therapies. Yamanaka was awarded the coveted Nobel Prize in Physiology or Medicine in 2012 for his outstanding contributions to the field, cementing his status as a pioneer in stem cell research and cellular reprogramming.



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- "Re-writing the code of life": Nobel chemistry prize goes to genome editing pioneers. (2020, October 7). NBC News. <https://www.nbcnews.com/news/world/nobel-prize-chemistry-awarded-scientists-jennifer-doudna-emmanuelle-charpentier-n1242378>
- Breakthrough Prize – Life Sciences Breakthrough Prize Laureates – Shinya Yamanaka. (n.d.). <https://breakthroughprize.org/Laureates/2/L36>

Pioneering Perspectives: Scientist Spotlight

Scientists are the unsung heroes of our time, whose relentless curiosity and dedication illuminate the mysteries of the universe. With boundless creativity and rigorous inquiry, they unravel the complexities of nature, forging pathways to progress and understanding. Their tireless efforts transcend borders, bridging cultures and generations through shared knowledge and discovery. From unlocking the secrets of the atom to decoding the language of life, scientists inspire awe and wonder, shaping our world with innovation and insight.

Ada Yonath

Ada Yonath revolutionized the science of biochemistry by deciphering the intricate structure of the ribosome, the fundamental biological component responsible for regulating the complex process of protein synthesis, using the novel technique of X-ray crystallography. Her groundbreaking research not only advanced our understanding of fundamental biological processes, but also cleared the door for the development of new antibiotics that target bacterial ribosomes. Ada Yonath was awarded the coveted Nobel Prize in Chemistry in 2009 for her extraordinary achievements and steadfast dedication to scientific growth, cementing her position as a leading figure in the field of structural biology.

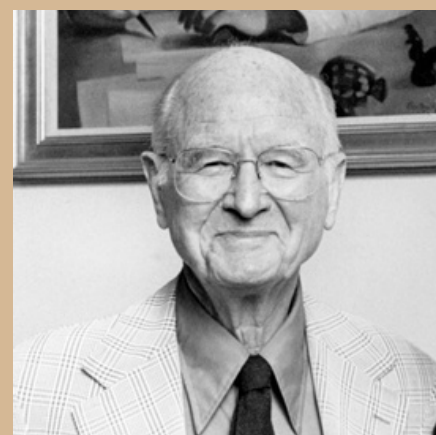


Françoise Barré-Sinoussi

Françoise Barré-Sinoussi, a French virologist, co-discovered the human immunodeficiency virus (HIV), which causes AIDS, in 1983. This groundbreaking discovery transformed our knowledge of the disease, paving the door for the development of diagnostic testing and antiretroviral medicines. Barré-Sinoussi's research has contributed significantly to the global fight against HIV/AIDS, saving many lives. In recognition of her major contributions, she and her colleague Luc Montagnier were awarded the Nobel Prize in Physiology or Medicine in 2008. This renowned award recognized her significant contributions to public health and biomedical research, solidifying her position as a pioneer in virology and infectious diseases.

Horace A. Barker

Horace A. Barker pioneered anaerobic metabolism, with a concentration on bacteria. His ground-breaking research on diverse *Clostridium* species provided crucial insights into the complexities of fermentation pathways. Barker's unwavering commitment to unravelling the mysteries of microbial metabolism yielded substantial contributions to the scientific community. His exceptional efforts were recognised with various awards, including the renowned National Medal of Science, which he received in 1971. This acknowledgment emphasised Barker's enormous impact on our understanding of the metabolic processes that occur within microbes, reinforcing his position as a pioneering figure in anaerobic metabolism research.



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- Pr Françoise Barré-Sinoussi - Expertise France. (2021, November 3). Expertise France. <https://rdvexpertise.fr/en/event-speaker/pr-francoise-barre-sinoussi/>
- Biochemist, National Medal of Science winner and retired UC Berkeley professor Horace A. Barker dies at 93. (2001, January 8). https://newsarchive.berkeley.edu/news/media/releases/2001/01/08_barkr.html

Pioneering Perspectives: Scientist Spotlight

In the quiet corners of laboratories, where the hum of curiosity harmonizes with the rhythm of discovery, scientists weave tales of enlightenment. They are the architects of understanding, sculpting the raw clay of the unknown into elegant monuments of knowledge. With each hypothesis, they paint strokes of insight across the canvas of existence, revealing the beauty hidden within the complexities of nature. In their pursuit, they illuminate the world with the ethereal glow of understanding.

Peter Charles Doherty

Peter Charles Doherty, a famous Australian immunologist, is widely regarded as a pioneer in the field of immunology, particularly in understanding the intricate mechanisms that underpin the immune system's response to viral infections. His important discovery of how T cells recognise and combat contaminated cells revolutionised our understanding of cellular immunity. Such vital study not only advanced the profession, but also earned Dr. Doherty the renowned Nobel Prize in Physiology or Medicine in 1996. This prestigious award recognises his work's enormous impact on biology, cementing his legacy as a trailblazer in the field of immunological research.



May-Britt Moser

May-Britt Moser and her research partner and husband, Edvard Moser, co-discovered grid cells in the hippocampus, making a groundbreaking contribution to neuroscience. These specialised neurons have a distinct hexagonal firing pattern that helps map spatial information in the brain, revolutionising our knowledge of spatial navigation. The discovery of grid cells has been critical in understanding the intricate systems that underpin the brain's cognitive functions, shedding light on how we perceive and interact with our surroundings. May-Britt Moser received the coveted Nobel Prize in Physiology or Medicine in 2014 for her remarkable impact on neuroscience, cementing her place among the most influential figures in the field.

Elizabeth Blackburn and Carol Greider

Elizabeth Blackburn and Carol Greider shared the coveted Nobel Prize in Physiology or Medicine in 2009 for their pioneering discovery of the enzyme telomerase and its critical function in chromosomal end integrity. This landmark result not only shed light on the intricate molecular mechanisms driving cellular ageing and proliferation, but it also has far-reaching consequences for gerontology and oncology. Through rigorous investigation and scientific insight, Blackburn and Greider discovered how telomerase, by preserving the length and integrity of telomeres, may influence susceptibility to age-related disorders like cancer. Their combined study not only advanced biomedical science, but also cleared the door for novel therapeutic approaches targeting telomerase to treat a variety of age-related illnesses. The Nobel Committee's acknowledgment of Blackburn and Greider reflects their significant contributions to understanding the fundamental principles underlying cellular ageing and disease progression.



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Content:
Medhavi Kaushik
B.Sc. (Hons.) Zoology, II Year

Compilation:
Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology, III Year



MYSTERY MAZE

Brainstorming: Dive Into the World of Riddles!

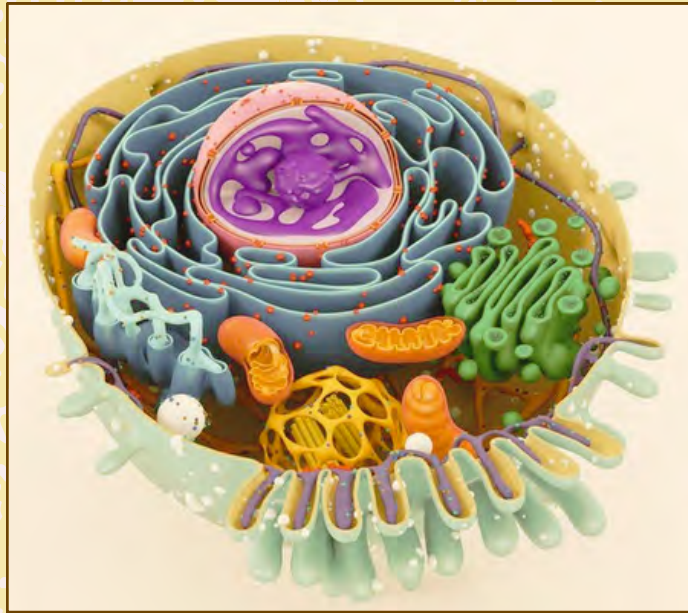


Source: Canva photos

1. I'm like the brain's text message, making neurons connect with a chemical dance.
What am I?
2. Think of me as the boss in the brain office, managing emotions and many more.
What am I?
3. When joy and reward begin to align, I am the chemical that lights up your mind.
What am I?
4. Imagine me as the brain's security guard, creating a protective shield. What am I?
5. Envision me as the messenger, shuttling commands to and fro in the brain. What am I?
6. See me as the electrical charge, the brain's power surge. What am I?
7. Picture me as the tiny explorer, branching out like a neuron's vine. What am I?
8. Imagine me as the sandman, regulating sleep and the circadian rhythm's sweep.
What am I?
9. Visualize me as the brain's glue, tightly holding cells together. What am I?
10. Imagine me as the peacekeeper, gracefully inhibiting signals. What am I?

Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year

Brainstorming: Dive Into the World of Riddles!



Source: Canva photos

1. I'm like the tiny powerhouse of the cell, working hard to turn nutrients into energy. What am I?
2. Think of me as the plant's sun-catcher, helping it turn sunlight into food. What am I?
3. I'm the four-letter code of life, the masterplan. What am I?
4. Picture me as the protective armour for plant cells, keeping them sturdy. What am I?
5. I'm like a bustling highway inside the cell, transporting essential substances. What am I?
6. Imagine me as the wise manager of the cell, overseeing all its activities. What am I?
7. Think of me as the cleanup crew, breaking down waste in the cell. What am I?
8. I'm the green artist in plant cells, crucial for the magic of photosynthesis. What am I?
9. Picture me as the vigilant gatekeeper, regulating what goes in and out of the cell. What am I?
10. I'm like the fluid heart of the cell, where many processes dance. What am I?

Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year

Unlock your Mind: One Clue at a Time!

N	A	N	O	P	A	R	T	I	C	L	E	S	W	M
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H	T	R	E	O	U	V	X	Z	A	Y	K	G	Y	T
Y	T	U	W	L	N	R	W	N	L	B	S	A	I	I
P	L	I	C	X	Q	I	E	N	I	P	Z	K	E	P
E	E	W	K	C	J	M	C	O	M	U	O	A	K	O
W	F	X	F	L	O	A	I	S	P	X	P	R	H	T
O	I	P	P	N	H	N	K	Q	U	Y	L	Y	L	E
O	S	L	E	I	K	R	Z	L	L	F	W	O	T	N
E	H	P	F	M	U	J	D	Z	S	K	T	C	T	C
P	H	W	L	P	P	K	W	H	E	S	F	Y	F	Y
E	C	O	S	Y	S	T	E	M	W	N	R	T	G	P
W	K	E	O	R	G	A	N	O	I	D	S	E	W	R

Search the following words:

- Nanoparticles
- Multipotency
- Sea Anemone
- Bioink
- Organoids
- Cuttlefish
- Bionics
- Impulse
- Megakaryocyte
- Ecosystem

Swastika Dey
B.Sc. Life Science
II Year

Unlock your Mind: One Clue at a Time!

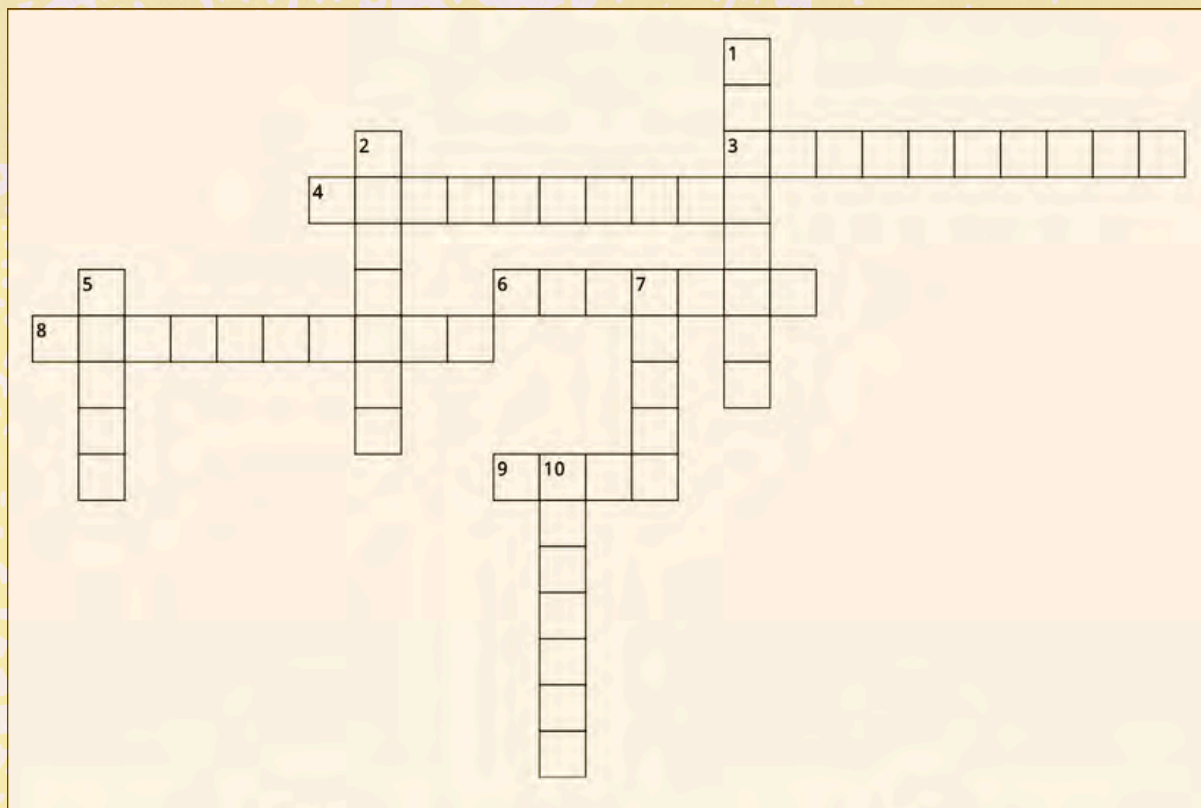
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I	U	C	H	R	O	M	A	T	O	P	H	O	R	E
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S	R	U	T	P	Z	A	L	J	L	V	N	M	A	E
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W	W	U	Q	A	Q	U	F	E	M	E	U	I	L	F
G	L	N	A	T	U	R	E	X	R	F	K	N	L	D
B	E	A	G	A	V	Q	O	I	R	W	F	E	S	J

Search the following words:

- Tubeworm
- *Trichoptera*
- Implant
- Immune
- Neuroglial Cells
- Isolation
- Chromatophore
- Methane
- Fauna
- Nature

Swastika Dey
B.Sc. Life Science
II Year

Unlock your Mind: One Clue at a Time!



ACROSS:

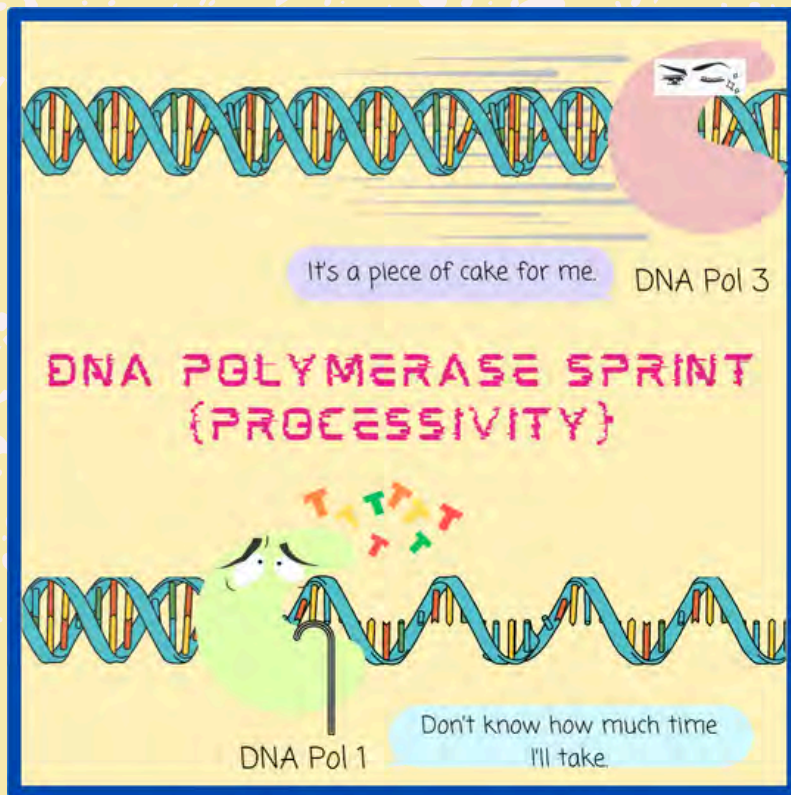
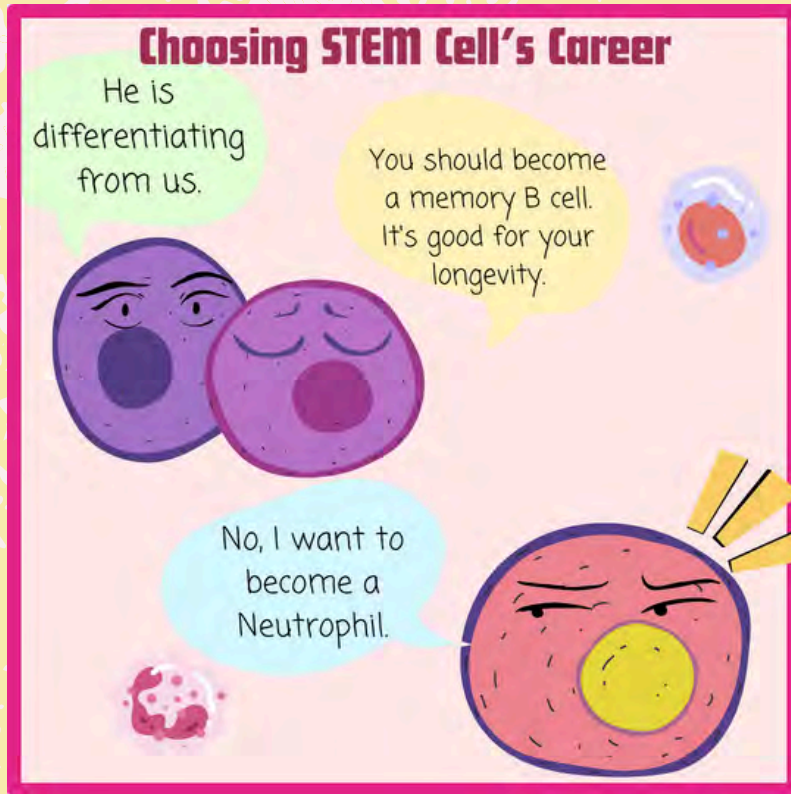
3. In depth of the sea where shadow looms, I dispel the darkness and my lure shines bright, Guess who am I lurking in the blue?
4. With feather bright and beak so keen, I dive into waters blue and green, my biomimicry inspires trains that glide, who am I?
6. I am black and white and love to slide but warming climates make it hard to thrive who am I?
8. I am tiny but mighty buzzing in the night my proboscis is so fine and inspired the less painful needle. guess who I am in this biomimicry land?
9. I am a bird, yet I cannot fly, extinct I am, beneath the sky. Once roamed Mauritius, with no fear, but now, I'm but a memory, dear.

DOWN:

1. I regenerate without a fuss, though lacking blood, I thrive robust. In tidal pools or ocean's crest, My five-fold symmetry's put to the test.
2. I'm small but mighty, with glass walls so fine, In oceans and lakes, I thrive in brine. Though single-celled, I make quite a scene, my shapes and patterns like nature's screen.
5. I sleep all day, high up in a tree, eating eucalyptus, my favorite spree. With fluffy ears and a button nose, in Australia's forests, I doze and doze.
7. I scale heights without care, my secret lies in my feet, which inspired the surgical glue. guess the bird!
10. With so many arms, yet no bone insight, with three heart beating I navigate the sea. what creature I am?

Soniya
B.Sc. (Hons.) Zoology
III Year
Swastika Dey
B.Sc. Life Science
II Year

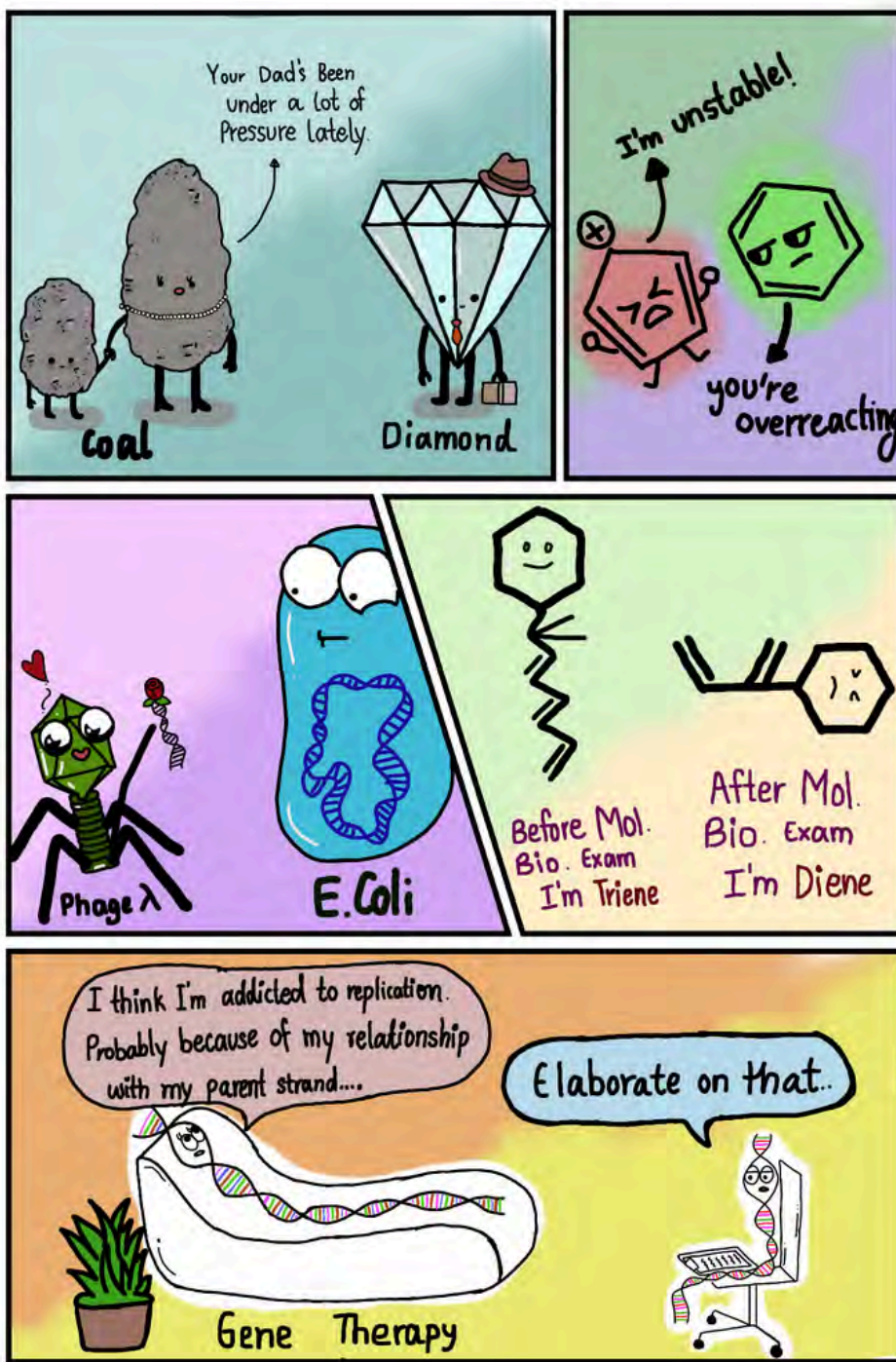
Meme Zone: Laugh Louder with Every Read!



Graphics: Canva

Khushi Prajapati
B.Sc. (Hons.) Zoology
III Year

Meme Zone: Laugh Louder with Every Read!



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Soniya
B.Sc. (Hons.) Zoology
III Year



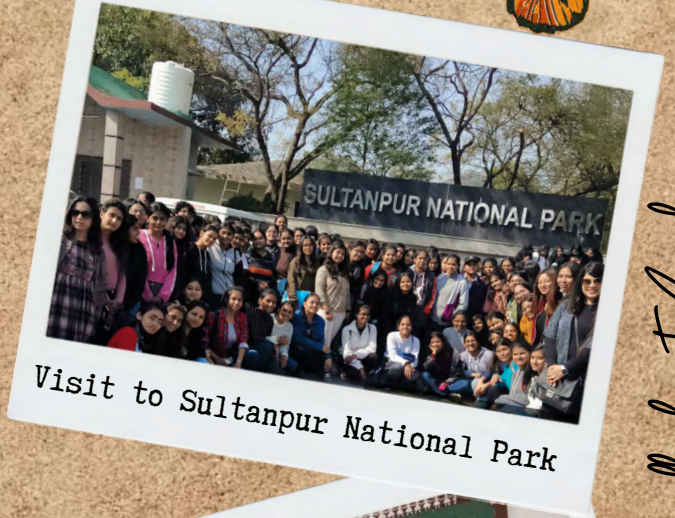
YEAR 2022-2023 AT A GLANCE



ZOOLOGY DEPARTMENT, 2022-23



Workshop on
Basic Laboratory Technique



Visit to Sultanpur National Park

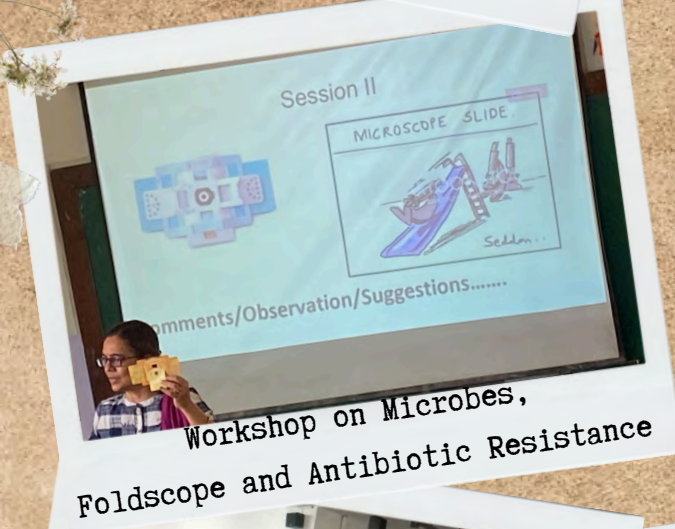
It's all about Zoology



New Delhi, Delhi, India
H5RG+VQ7, Jesus And Mary Marg, Bapu dham,
Alumna Interaction



Delhi, Delhi, India
Teacher's Day Celebrations



Session II
MICROSCOPE SLIDE
Comments/Observation/Suggestions.....
Workshop on Microbes,
Foldscope and Antibiotic Resistance



Fresher's Party



Career Counseling Session

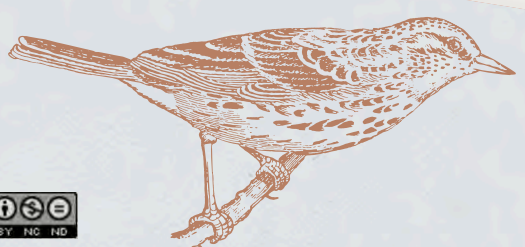
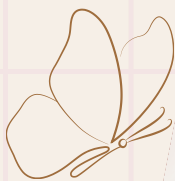


Farewell to 2020-23 Batch

ZOOPHORIA, ZOOLOGY FEST, FEBRUARY 2023

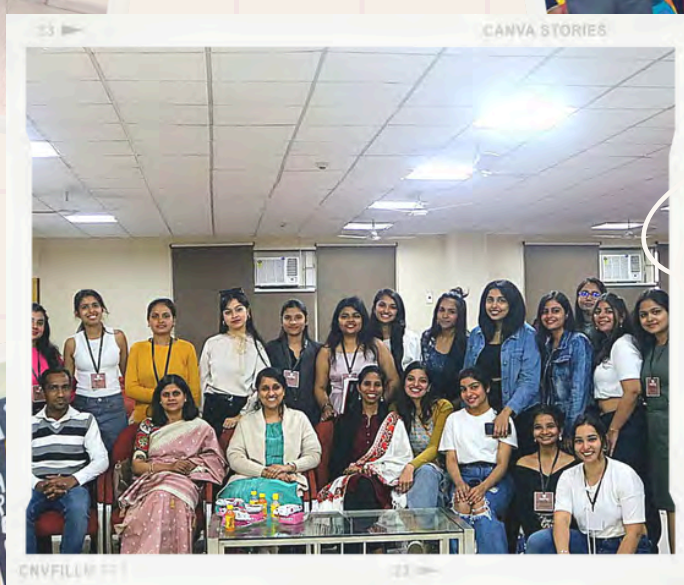
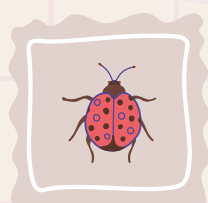
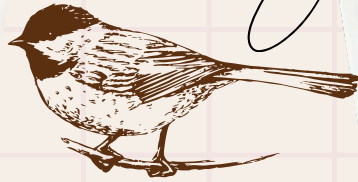


#moments



ZOOLOGY

TRINITY, LIFE SCIENCE FEST, FEBRUARY 2023



Happiness



It's all about life
science



KUMBHALGARH UDAIPUR TRIP, JANUARY 2023

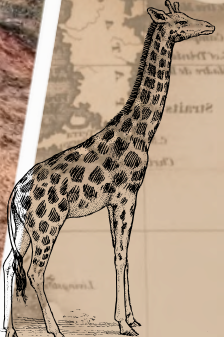
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ANSWERS

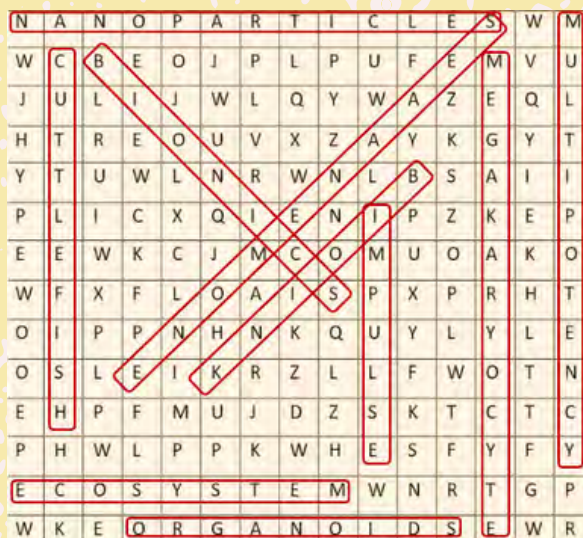
Brainstorming: Dive Into The World of Riddles!

P-69 1. Neurotransmitter 2. Serotonin 3. Dopamine 4. Blood-Brain Barrier 5. Axon 6. Action Potential 7. Dendrite 8. Melatonin 9. Glial cells 10. GABA (Gamma-Aminobutyric Acid)

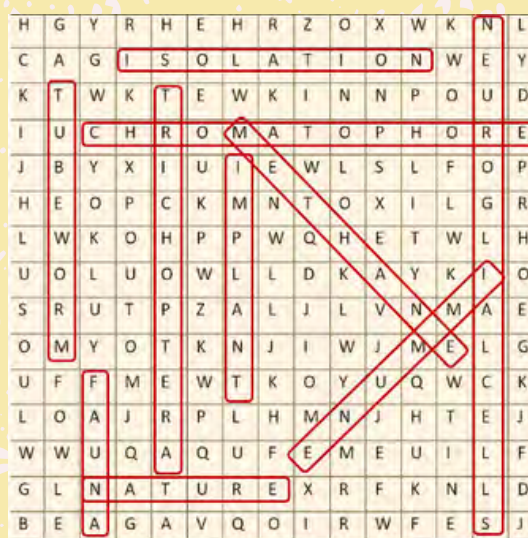
P-70 1. Mitochondria 2. Chloroplast 3. DNA 4. Cell Wall 5. Endoplasmic Reticulum 6. Nucleus 7. Lysosome 8. Chlorophyll 9. Cell Membrane 10. Cytoplasm

Unlock your Mind: One Clue at a Time!

P-71



P-72



P-73



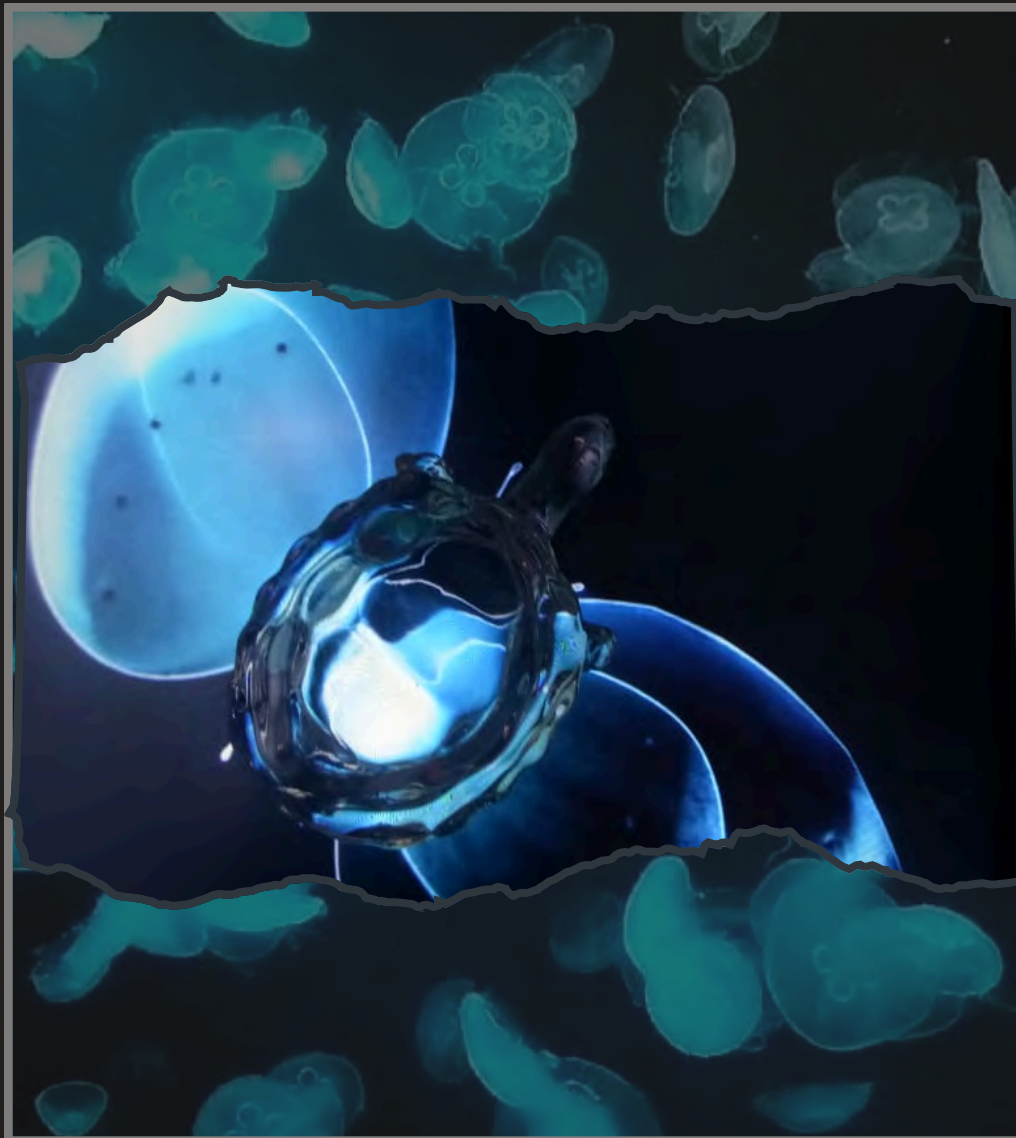
INTERVIEWS' CREDITS:

Medhavi Kaushik
B.Sc. (Hons.) Zoology
II Year

Vaishnavi Rajagopalan
B.Sc. (Hons.) Zoology
III Year

Jyotsna Mishra
B.Sc. Life Science
III Year

**ZOOLOGY DEPARTMENT
MAITREYI COLLEGE
UNIVERSITY OF DELHI**



PICTURE CREDIT:
GURMEET
B.Sc. (Hons.) Zoology
BATCH 2018-21

PICTURE CREDIT:
KIRTI MOURYA
B.Sc. (Hons.) Zoology
I Year

COVER DESIGN CREDIT:
JYOTSNA MISHRA
B.Sc. Life Science
III Year