EVOLVERE

THE UNFOLDING

THE ZOOLOGY DEPARTMENT MAGAZINE

VOL.12

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Staff Advisor's Note

Greetings to all our readers!

We present to you the 12th edition of Evolvere, the unfolding, The Annual Magazine of Department of Zoology, Miranda House. We are delighted with the successful completion of the academic year 2021-22, which was very fulfilling with many activities organized by Synapse, our society. The earlier part of the academic session was held online due to the ongoing pandemic. However, effective teaching and learning continued throughout the session and we transitioned smoothly to offline teaching. The resilience and enthusiasm shown by our students and staff during this time has been commendable.

We congratulate our dedicated editorial team for bringing out this astounding issue of the magazine, which will captivate its readers. This issue contains the glimpses of various events conducted by Synapse for career counselling of the students by the alumni of the department, workshops for meditation and mental health, contemporary science articles, book reviews, poems, and musings written by our students. The magazine includes a special section, for the students to share their internship experiences. We hope that this edition inspires everyone to continue the quest for science communication and writing. Best wishes to our dear outgoing batch 2019-2022. We wish you success in all your future endeavours.

Staff Advisors
Dr. Nisha Vashishta
Dr. Yasha Yadav

President's Note

Those who envy your flight,
Haven't even learnt to walk,
Why bother listening to those,
Who lead their lives in shackles,
The sky belongs to you,
So does the rainbow,
Which they only yearn to see!

It's a privilege to present to you 'EVOLVERE', the most awaited annual departmental magazine, the fruit of the hard work put together by the entire department. I would hereby also like to thank the editorial team for constantly putting in all the efforts and dedication throughout the year.

I can very confidently state that Synapse has maintained its legacy, setting the bars higher than ever with incredible growth. This session certainly stands out, as the pandemic brought in new waves of challenges to face. But no obstacle could stop the department to impart knowledge and wisdom to its students. Keeping in mind students' interest and overall growth the session has for the first time introduced many new events like the Mentor-Mentee program, an enriching series of career counseling sessions that witnessed enormous participation, Synapse Podcast-Listen wherever you go and Biweekly Blogs- Sapientiae were the major platforms that brought in new opportunities for students of the department to showcase their skills and potentials, Monthly Newsletters- Verba Scientiae, activities on the society's social media page - Weekly Quizzes, QOTDs, Special Days, and what not!

On behalf of the entire society, I would like to extend my heartfelt gratitude to Dr. Nisha Vashishta and Dr. Yasha Yadav, for their impeccable support and guidance throughout the year.

I would like to thank the wonderful faculty of the department, the most helpful lab staff and my amazing team of young, creative, enthusiastic, and extremely talented office bearers and volunteers for their involvement and willingness to take on the completion of tasks beyond their comfort zones. Thank you everyone for making this year a memorable one!

Swathi B. Choudhary
President

Editorial Team Note



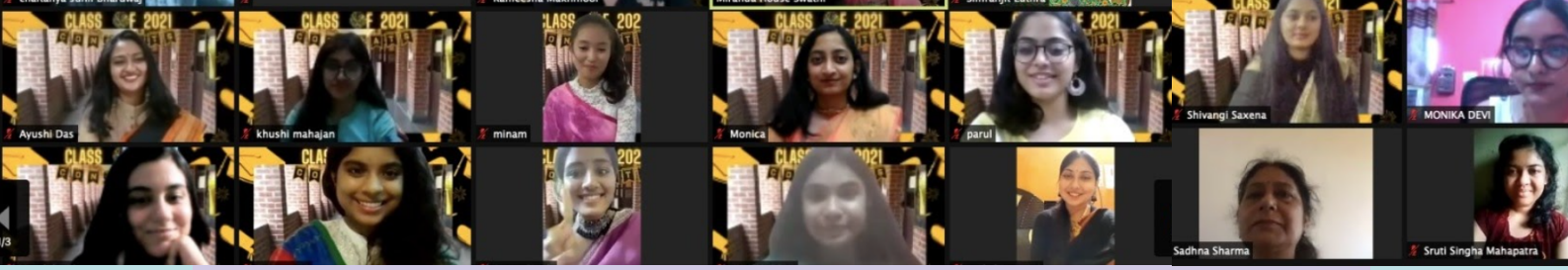

"A book must be the axe for the frozen sea within us."
Franz Kafka

While our efforts might not live up to those of great educators and researchers we learn from, we have endeavored. It has been a testing and thrilling experience to transition from the grips of the pandemic to the not so normal normalcy of today. To this end we owe much to our teachers and guides.

Through this magazine, we have hoped to document and honor all the efforts put in by each and everyone of us. Ultimately, it serves as an ode to us and the spirit of persevering, despite all. A comprehensive series of sessions and invited lectures helped expand our horizons and allowed us to explore opportunities that had been rendered inaccessible due to the pandemic. While offline visits proved to be a waking dream, due to the consistent efforts of our teachers and the union, we had the privilege to witness online visits to various scientific facilities such as biodiversity parks and reserves.

The skills possessed by the students extend much beyond the field of scientific learning. Scientific articles contributed by the students show impeccable research and writing abilities. Artworks, poetry, illustrations only scratch the surface of the limitless potential they possess. Thus we dedicated a section to appreciate their myriad achievements. We also hope to keep your brain cells firing with a zoology themed crossword and quiz section.

Editors: Kamakshi & Kritika
Co-editors: Damayanti & Sruti



News & Events

Career Counseling
Ms. Ajeeta Longjam | 6 July 2021

Career Counseling
Ms. Zaara Haroon | 7 August 2021

Career Counseling
Ms. Elangbam Sonia | 14 August 2021

Career Counseling
Ms. Asima Abidi | 21 August 2021

Career Counseling
Dr. Megha Mittal | 28 August 2021

Invited Lectures
IRS Ravi Kapoor | 18 September 2021

Invited Lectures
Ms. Nilanjana Maulik | 30 September 2021

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29 October 2021 | Synapse

Freshers' Orientation 2021
20 November 2021 | Synapse

Career Counseling
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Dr. Asmita Patil | 20 December 2021

Visits
Aravalli Biodiversity Park
15 February 2022

Mental Health Session
Ms. Saveera Dugal Bahl
17 February 2022

Campus Bird Count
18 February 2022

InTeGrate: Science Carnival
28 February - 3 March 2022

Indian Agriculture
Research Institute (IARI)
4 April 2022

18 April 2022
Impulse: The Annual
Department Fest

Career Counselling : Way Forward

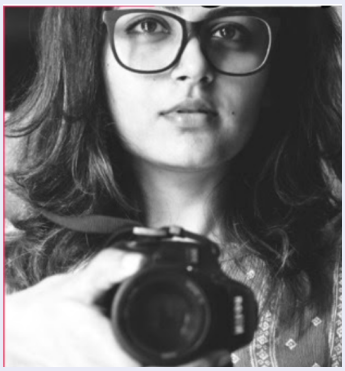
Ms. Ajeeta Longjam | 6 July 2021 | Synapse & IQAC MH

"Going with the flow is the easiest and the hardest thing to do."

The session saw the participation of over a hundred students. An MH alumna, Ms. Longjam recounted her journey from her Manipur hometown to her Delhi college life. Her experiences in the civil services helped her understand the problems at the grassroot level and how circumstances aren't always as we want them to be. She highlighted the importance of one's hobbies and the need to maintain a healthy work-life balance. The session inspired the students to stay motivated, face challenges bravely and keep working hard.

The Gestalt Approach: Self discovery for Creative Expression and Communication

Ms. Zaara Haroon | 7 August 2021 | Synapse & IQAC MH



"The whole is greater than the sum of its parts"

An alumna of MH Zoology Department Batch 2007 and currently a photojournalist, Ms. Zaara Haroon, enlightened the students with different career opportunities through the concept of the Gestalt Approach. Ms. Haroon inspired us not to look at our career in isolation with what we have today but with respect to the opportunities that are being created for tomorrow.

Limitless Opportunities: Finding the Key to Life

Ms. Elangbam Sonia | 14 August 2021 | Synapse & IQAC MH

"If you want it done right, do it yourself"

From being a like a duck, calm on the surface while paddling hell underneath, to forgiving ourselves and staying strong during the hardest times, Ms. Elangbam Sonia, an MSC/ Deputy Secretary in the Government of Manipur and once a student of the Zoology Department of MH (Batch 2003), shared with us many a lessons that she learnt herself from the various phases of her life. She helped us realize that there is no dearth of career opportunities, we merely need to look around for them, and that any knowledge can shape our careers if we just know what our interests and capabilities are.

Pursuing Higher Education Abroad

Ms. Asima Abidi | 21 August 2021 | Synapse & IQAC MH

Ms. Asima Abidi, a PhD scholar in Immunology at the Radboud Institute, the Netherlands and an MH alumna of the Batch 2017, deliberated the pros and cons of studying abroad. On one hand, there is a lot of diversity in the courses, interactions with the best academicians out there and access to state-of-the-art infrastructure besides the added independence, whereas on the other hand there is cut-throat competition, loneliness and a need for financial help. Ms. Abidi motivated us to keep our options open at all times while inspiring us to make our own decisions.

Think Beyond Normal

Dr. Megha Mittal | 28 August 2021 | Synapse & IQAC MH

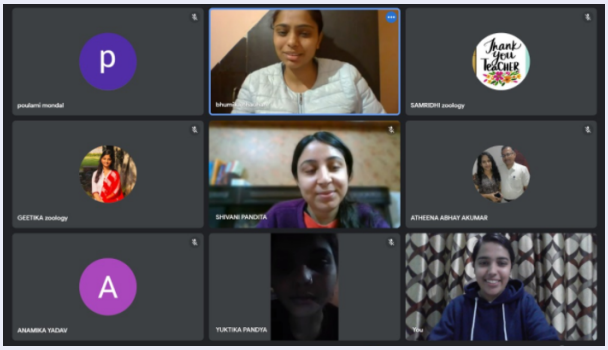
"Growth and comfort cannot be together but there is comfort in growth"

Dr. Megha Mittal, an Executive Coach and Leadership Facilitator and an alumna of Batch 2007, encouraged us to find our own ikigai, the reason for our being. Married at the mere age of 23 into a conservative family, she survived an abusive marriage and rose from the ashes to emerge as a successful entrepreneur. Her life motivated us to stay positive no matter how grim the situation is. She inspired us to take the rein of our lives in our own hands to make it better.

Career Counselling Session: What's next ?

Ms. Bhumika Chauhan | 18 December 2021 | Synapse

A career counselling session was held for the III year students of B.Sc. (H) Zoology. The expert Ms. Bhumika Chauhan, Assistant Professor, Department of Zoology, Miranda House, told the students about various opportunities in the field of Zoology and related areas after graduation and the entrance exams that they can appear for. Ms Chauhan helped the students get a clearer idea of what careers they can pursue. She motivated the students to follow their passions and helped us realise that it's never too late to follow your dreams.



Sessions on Mental Health

Sessions on Science of Spirituality

Sessions on Science of Spirituality organised by the Sawan Kirpal Ruhani Mission: Two sessions were conducted on the topics "Fearlessness in Challenging Times through Meditation" and 'Empowering your persona through Meditation". The speaker for both the sessions was Ms. Seema Charla.The first session was about how to overcome the fear and panic caused by the pandemic through meditation. The positive effects of meditation, its effect on hormonal balance, peaceful state of mind, and positivity, was elaborated upon. The second session focused on the positive effects of meditation on our physical and mental health.

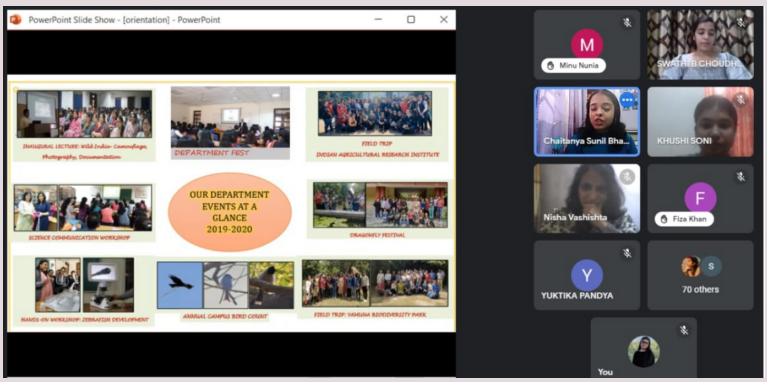
Meditation gives us energy and strength, reduces stress, cardiac diseases, diabetes and hormonal disorders. In this age of technology, our concentration and productivity is decreasing while distractions are increasing. Meditation helps reshape the brain, increasing grey matter and increasing our IQ, memory and concentration. Ageing of the brain is also reversed. Both the sessions ended with a 10- minute meditation session and a question-answer session.

Mental Health Session: Coping with Stress and Anxiety

Ms. Saveera Dugal Bahl | 17 February 2022 | Synapse

This session was conducted on the 17th of February. The speaker was Ms. Saveera Dugal Bahl. This session aimed to teach the students how to deal with anxiety and stress that is very common among students. The main cause for that is dealing with academics.The speaker shared her own experience of adjusting to campus life, the values she learnt from that. She advised finding happiness in small things in our everyday life, instead of expecting major gains.

Freshers' Orientation 2021
20 November 2021 | Synapse



Parents Teacher Meeting
29 October 2021 | Synapse

Visits

Virtual Jungle Safari to Dudhwa Tiger Reserve

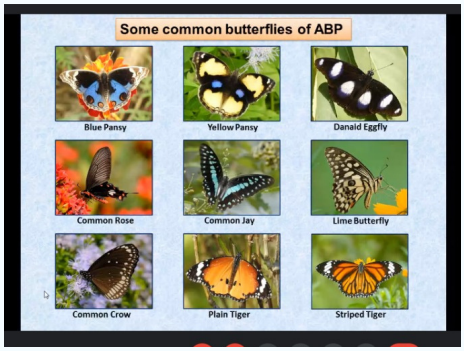
8 October 2021

A virtual tour to Dudhwa Tiger Reserve was organised on 8th October 2021 by Synapse. The tour guide, Ms. Deepti, Camp leader, National Environment Science Camp, Dudhwa Tiger Reserve, illuminated us about the significance of the reserve and patiently pointed out all the animals including swamp deer, Kingfisher, brahminy ducks, fish eagle, hog deer, Summer deer, nilgai, leopard, jungle cat, etc. throughout the entire journey in the jungle. The tour though virtual, was a refreshing break from the monotonous online classes for the students.

Virtual Tour of Aravalli Biodiversity Park

15 February 2022 | Synapse

A virtual tour of the Aravalli Biodiversity Park was organised on the 15th of February. The event was attended by students of all three years. The guide of the event showed the flora, fauna and ecosystem of the biodiversity park using pictures and videos. The restoration and management of the park was also explained by her. The session concluded with an interactive session with the students.



Visit to Indian Agriculture Research Institute (IARI)

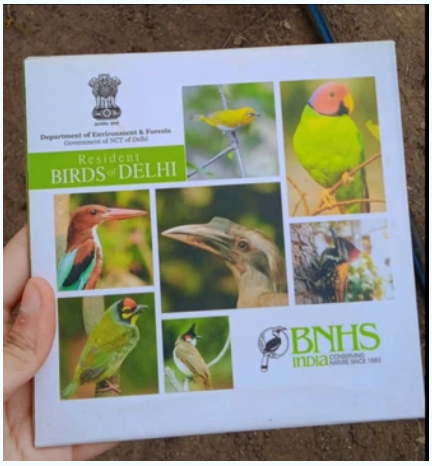
On the 4th of April, 2022, the batch of Zoology Honours Second year students, along with the 2nd and 3rd years of the Life Sciences course, went on an educational trip to the Indian Agricultural Research Institute, Pusa Road, Delhi.

The students visited the entomology department of the institute, where they were given a detailed account of the equipment used in artificial beekeeping. They were also introduced to the honey processing plant of the institute. After this, they were allowed to see the live artificial beehive that is being maintained inside the department. Lastly, the students visited the entomology museum which has a splendid collection of butterflies, insects, beetles, silkworms and other arthropods. Overall, it was an informative and enjoyable trip.

Campus Bird Count

Synapse & MH Vatavaran | 18 February 2022

On 18 February 2022, 'Campus Bird Count' was organised in the Miranda House Campus under the 'Great Backyard Bird Count' initiative. It was organised jointly by MH Vatavaran and Synapse. Mr. Chandra Bhushan Maurya, a Delhi-based birder, was the chief guest of the event who guided the students in identifying the birds. The events was attended by over 40 students and a total of 25 species were identified. The species spotted included- Rock Pigeon, Black Kite, Asian Koel, Red whiskered Bulbul.



Invited Lectures

Civil Service as a Career : To Be or Not To Be an IAS Officer and Why it Matters

IRS Ravi Kapoor | 18 September 2021 | Synapse & IQAC MH

Your passion is not enough. Your action is not enough. Your passion, action along with the present situation within a combination only matters."

Mr Ravi Kapoor, an IRS (Indian Revenue Service) Officer, currently serving as a Deputy Commissioner, Ministry of Finance, Government of India and the author of 'The Ultimate Cheatbook of Essay and Answer-writing', threw light upon why is it important to have a career and why should it be in accordance with your passion. He also motivated the students to find their passion. He also introduced the students to the hexacast method (big picture formation, 1st reading, 2nd reading, analysis of previous year questions, revision and testing and evaluation)as a tried and tested method to sit for any exam, especially one with a cut-throat competition such as UPSC.

Know Dementia, Know Alzheimer's

Ms. Nilanjana Maulik | 30 September 2021 | Synapse & IQAC MH

September 21 is designated as World Alzheimer's Day, and September as Alzheimer's awareness month. To raise awareness about the same, Synapse organized a lecture titled "Know Dementia, Know Alzheimer's", on the 30th of September. The Guest Speaker was Ms. Nilanjana Maulik, National Coordinator Working Group - ARDSI & Secretary General at ARDSI Calcutta Chapter, who works extensively with dementia patients. She enlightened the participants about various aspects of dementia and highlighted the importance of caregivers in the life of the patients.

Pollution and Reproductive Health: Tomorrow's Children Dr. Saroj Kesar Memorial Lecture

Dr. Asmita Patil | 20 December 2021 | Synapse

A lecture was organised in memorium of Dr. Saroj Kesar, Associate Professor, Department of Zoology, Miranda House. Dr. Kesar's work in neurophysiology in association with ICMR, AIIMS earned her the accolades of many. She was a member of the International Brain Research Organisation. Even after retirement, she continued to work with many NGOs to work for the upliftment of marginalized people.

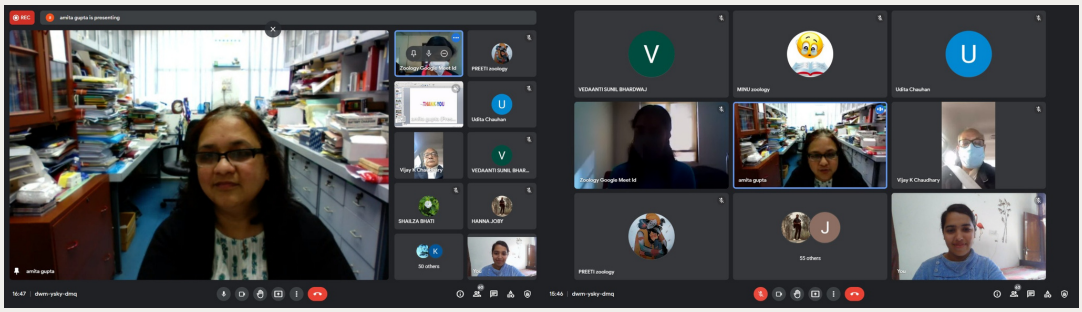
The memorial lecture was delivered by Dr. Asmita Patil (MBBS, M.D.) from AIIMS centered on the themes of Pollution and Reproductive Health. Dr. Patil highlighted the effects of pollution through the constituent particulate matter which has the potential to cause severe cardiac disorders including arrhythmias, vascular inflammation etc. In adults, pollution leads to multiple issues with fertility and gamete development. These findings are substantiated by animal model studies where exposing healthy male Wistar rats to diesel exhaust was correlated with decreased sperm quality and lower levels of circulating gonadotropins. Collaborations between IIT Delhi and AIIMS Delhi are underway that study the impact of pollutants on reproduction.

InTeGrate: The Science Carnival

28 February 2022 to 3 March 2022 | Synapse & IQAC MH

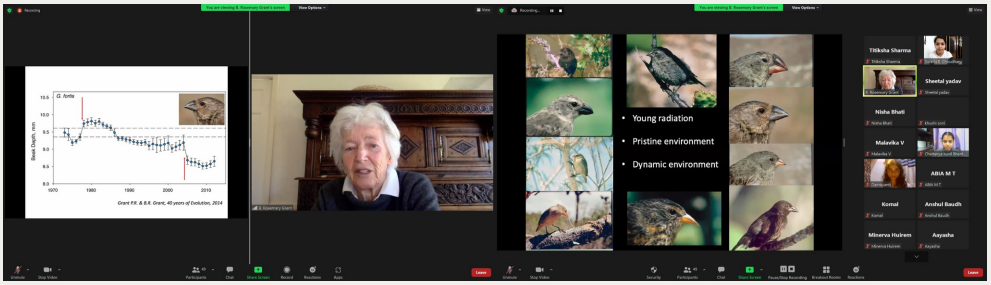
On the occasion of National Science Day, Synapse, the Zoology Society, under that aegis of IQAC, organised a week log science carnival from February 28 to March 3, 2022. The guest speakers, Dr. Amita Gupta and Dr. Manisha Goel made the students aware about biotehnology techniques such as NEVA and CRISPR. These were followed by a lecture by the renowned evolutionary biologist Prof. B. Rosemary Grant. She enlightened the students with her decades of research in the Galapagos islands. The carnival concluded with a virtual tour of the Bannerghatta Rehabilitation Centre on 3 March, 2022.

Day 1 (28 February 2022) | Dr. Amita Gupta | NEVA - A Technology for Rapid Diagnosis

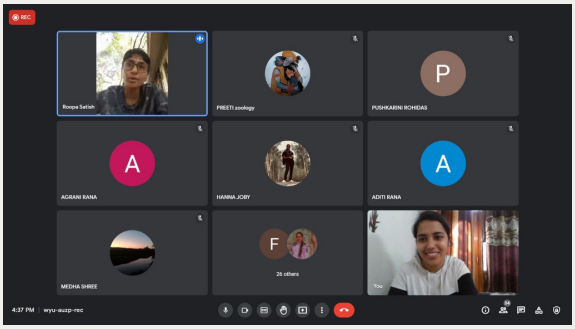


Day 2 (1 March 2022) | Dr. Manisha Goel | CRISPR Systems: Assigning Functional Definitions to Diversity of Archaeal Cas4 Proteins for Potential Applications in Genome Editing Strategies

Day 3 (2 March 2022) | Dr. B. Rosemary Grant | Evolution of Darwin's Finches in Galapagos:Integrating Behavior, Ecology and Genetics



Day 4 (3 March 2022) | Dr. Roopa Satish | Virtual Tour of Bannerghatta Rehabilitation Centre,Wildlife Rescue And Rehabilitation Centre (WRRC)



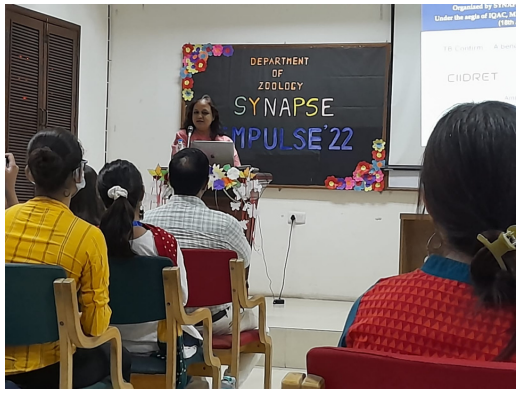
Impulse: The Annual Department Fest

18 April 2022 | Synapse

Impulse 2022, the annual fest of the zoology department, was held on the 18th of April. The events of the fest were: talks by guest lecturers, Dr. Amitabh Joshi and Dr. Amita Gupta; a model-making competition, quiz competition, and debate competition. Dr. Amitabh Joshi spoke about evolutionary biology, his work in that field and future prospects. Dr. Amita Gupta spoke about her work in developing a low-cost but highly precise testing kit for TB.There were 4 teams participating in the model making competition,16 students for debate competition and 7 teams for Quiz. Overall, it was an enriching and enjoyable experience for the entire department.

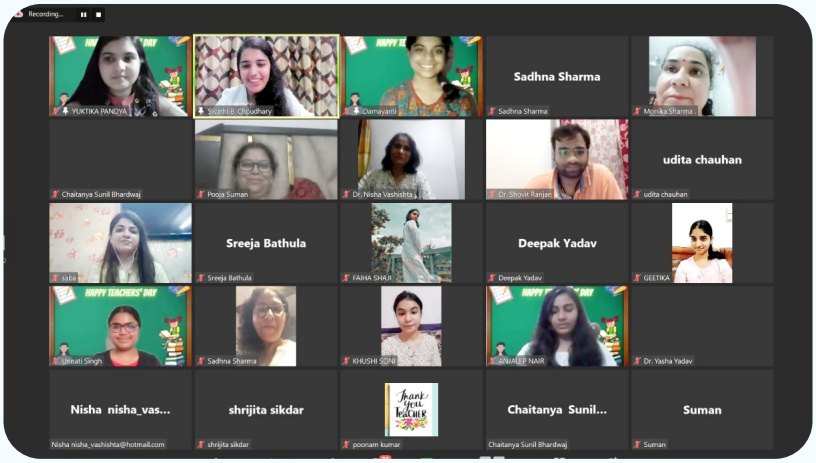
Dr. Amitabh Joshi | Evoultionary Biology in the Lab & Beyond

Dr. Amita Gupta | TB Confirm: A Bench to Bedside Success Story

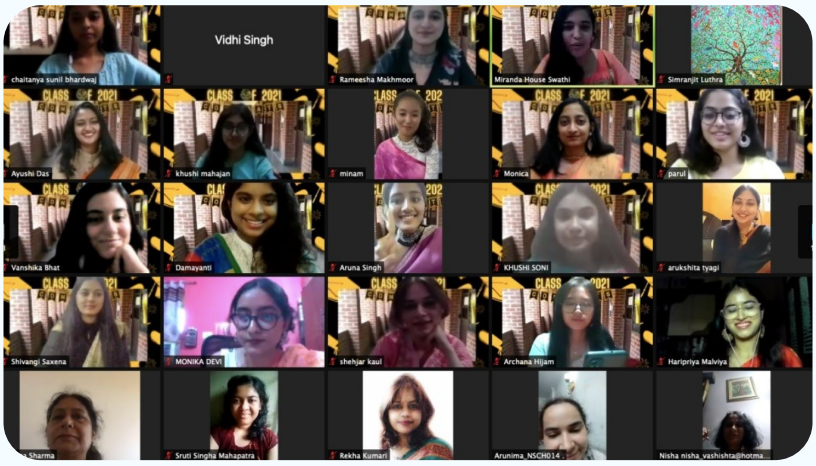


Science Exhibition | Everything Under The Sun

Inter College Quiz Competition | Quizzard for Cognizant



Teachers' Day



Farewell

Culturati - The Freshers' Welcome

Special moments

Articles

ENVIRONMENT MATTERS FOR MOSQUITOES

By Ms. Rangoli Singh, Ms. Manisha Pandey, Dr. Vimal Thareja

Mosquitoes are present worldwide causing a biting nuisance, disturbance, and danger to human lives as they are transmitters of several diseases.

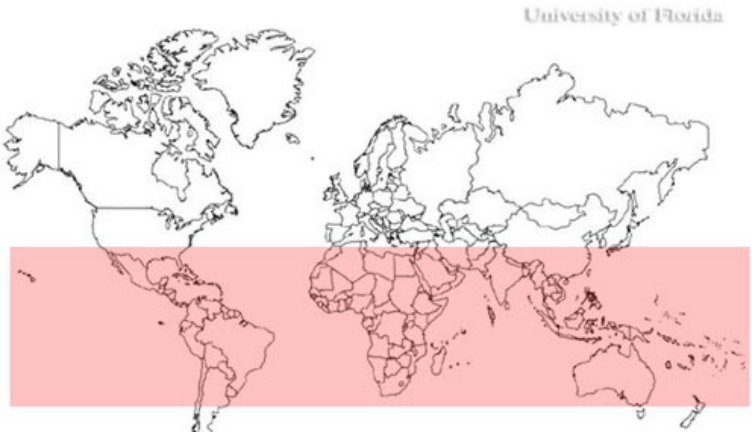


Figure 1. World distribution of the southern house mosquito, Culex quinquefasciatus Say. Illustration by Stephanie Hill, University of Florida.

To stop the spread of mosquitoes chemical control measures are commonly employed across the affected world as adulticides and larvicides. These chemical insecticides are intensively sprayed inside the urban housing and in the peri-domicile under thermal-fogging or ultra-low volume. In addition to chemical insecticides, there is sparse usage of biological measures to control adult and larval stages of the mosquito, including plant-based agents, bacteria, and predator fishes.

Due to relentless large-scale usage of all forms of chemical insecticides - the vector species have developed resistance to them either through the increase in the metabolic detoxification or alteration in the insecticide target molecule. Metabolic detoxification is enhanced as mosquitoes develop the ability to modify or break up the insecticide molecules before they reach their target. Further, target-site alterations inhibit the interaction between the insecticide and its target molecules.

Figure 2. Symptoms of lymphatic filariasis, a) oedema in the leg credit- Washington University School of Medicine in St. Louis b) oedema in breast – credit science photo library

Mosquitoes serve as a crucial experimental model owing to larval transparency. The mosquito of our research interest - *Culex quinquefasciatus* Say – one of the vector species - is a medium-sized brown mosquito that exists throughout the tropics and the lower latitudes of temperate regions.

It is an established species in India that makes it extremely difficult to uproot. It is a principal vector for lymphatic filariasis and a carrier of many other viral diseases. Lymphatic filariasis is an incurable disease and a social stigma. Worldwide ~856 million people in 52 countries remain threatened by lymphatic filariasis - India alone contributes 40% of this burden. Currently, preventive chemotherapy is the only way to stop the spread of parasitic infection. Though impacting the lives of millions – Lymphatic Filariasis ironically is a Neglected tropical disease (NTD).

What is the environment like for mosquitoes? And when and how it matters?

Optimum conditions for mosquitoes are defined as 27+/-2 degrees Celsius and 80% relative humidity. This favorable environment coincides with monsoon season when there is a noticeable spike in mosquito breeding sites. In these conditions, *Culex quinquefasciatus* grows exponentially to reach the peak of its population. All the stages of mosquitoes - the egg, the larva, the pupa, and the adult – benefit, and have a higher likelihood of surviving more leading to a more frequent turnover of adults. Even if one were to eliminate 50% of their population the remaining 50% would still be a huge number enough to cause diseases. States bordering sea like Maharashtra maintain favorable conditions throughout the year. But states like Delhi and Uttar Pradesh show peak and trough variations in environmental conditions.

During extreme conditions in the winters when temperature goes as low as 2 degrees Celsius, the species population dwindles - larval population takes a dip with lesser sites to reach for control, high intrinsic mortality in larvae and weak surviving larvae to combat man-made assaults. Further, during the overwintering period, the larval stage is prolonged and the larval sites usually being immobile in metro cities with no fast-flowing water present an appealing proposition for reducing the adult mosquito population. Our research highlights the importance of source reduction especially the overwintering sites. The research also shows how extreme conditions strongly impact fertility, blood-feeding, fecundity, oviposition behavior, egg hatchability, and longevity and how overwintering sites can be used as a biological tool for source reduction.

Nature itself controls the vector species during extreme conditions and it's a disaster for vector species. If we follow the que given by environment and introduce the stringent artificial control measures for the vector population during extreme conditions - it would restrict species exponential growth during optimum conditions.

A modeling study published in Nature Communications predicts that the world will become a more suitable proliferation ground for mosquitoes by 2050 owing to urbanization and global warming that has aided in their proliferation as warm and wet environments are excellent places for mosquitoes to breed. The changing global environment conditions are aiding mosquito growth, and chemical pesticides are adding to the trouble by making the vector species more resistant and contaminating the environment, which may cause several long-term effects on the human population. A classic example of how harsh chemicals usage for quick outcomes leads to long-term dangerous effects in Punjab. Large dosages of pesticides used in the 1970s during the green revolution have not only made pests immune to them but also have heavily contaminated the soil, air, and water table of the region. Families in Punjab now suffer from severe illnesses such as cancer, birth -defects, renal failure, and stillborn babies.

Therefore, it is important to look for eco-friendly biological alternatives to combat them before it's too late. Our research highlights the use of eco-friendly tools such as Neem Seed Kernel Aqueous suspension (NSKAS) and *Gambusia affinis* (a predatory mosquito fish) to regulate the vector population. NSKAS - at low concentrations caused severe deformities and mortality in the species. Various morphological deformities observed post-NSKAS treatment supports it to be a stomach respiratory poison and a molting disruptor. In a separate experiment, the introduction of Gambusia affinis was followed by the absence of larvae and induced deterrence to oviposition of *Cx. quinquefasciatus* during winter.

Death due to diseases caused by mosquitoes is a global burden with a disproportionately high share from the African region. Neem technology has been prevalent in Asia, central and south America, Africa where neem trees are native, and in parts of the United States like Florida, Canada, Europe, and Australia where neem tree farming is established. In view of the global availability of neem, the proposed NSKAS-based application will have no constraint in its large-scale implementation.

With such a widespread of the vector species and owing to the absence of effective vaccines available against most of the Culex-transmitted pathogens, the best strategy to avoid transmission relies on the control of the mosquitoes. Integrated Vector Management (IVM) during non-optimum months (winters) when species are overwintering, and optimum large-scale use of eco-friendly tools such as NSKAS, G. affinis and source reduction of larvae during the overwintering period is the need of the hour.

A recent Stanford (US) study conducted in Kenya follows steps similar to our original research on eco-friendly tools including source reduction to control the mosquito vector species. The world is now identifying the importance of these tools that should be used as a part of the vector control management strategy.

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- *Overwintering sites and strategies of Culex quinquefasciatus (Diptera: Culicidae) larvae and impact of neem seed kernel aqueous suspension (NSKAS) and other eco-friendly tools on them - CODEN: IJMRK2 - V. Thareja, A. James, Rangoli Singh, Anjana Singha Naorem, Manisha Pandey, Z. Khan, Souvik Sensarma, Stuti Mohapatra https://www.researchgate.net/publication/322207776*

Dr. Vimal Thareja is a former professor of the Zoology department. Team Involved in general in above research beyond listed authors: Aradhana Sareen, Garvita Goyal, Kanika Anabh, Shruti Acharaya, Radhika Basotra, Smriti Soni and Geeta Dhania.

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DECODING THE HUNGER EQUATION

By Atheena Abhayakumar

With the world population hiking everyday it is assumed that the scarcity of food will be one of the main challenges awaiting humanity. It is estimated that the world population will reach 1,000 Core by 2050. But do we really have the means to feed this 1000 Cr stomachs? No, we don't. Green revolution 1 of the 1960s was able to increase the food availability corresponding to the hike in population by using chemical fertilizers, pesticide and improved varieties of seeds. A further increase in crop productivity using the existing techniques is not feasible. A possible alternative is to modify and tame photosynthesis so that we can increase its efficiency. And this is one of the most active fields of research in the present scientific world.

The efficiency of photosynthesis is 0.00025 %. Even though photosynthesis is our life saving reaction, it is also one of the least efficient reactions on earth. This decrease in efficiency is attributed to the manufacturing defect of the enzyme RuBisCO, which shows affinity for both O2 as well as CO2 (ideally RuBisCO is assigned to supply CO2 during the dark reaction). When RuBisCO binds to oxygen instead of CO2, toxic byproducts such as glycolate are formed in dark reaction. Plants have evolved 'photo respiration', which helps them to processes these toxic wastes. But photo-respiration requires a lot of energy to proceed. Photo-respiration can reduce C3 crop photosynthetic efficiency by 20 to 50%. The catalytic ability of RuBisCO is also very less. When other enzymes catalyse thousands of reactions in a second, RuBisCO can only catalyse two or three reactions in a second. A common question that can come to our mind is ' can we modify RuBisCO an increase the efficiency of photosynthesis?'. But sadly that is not possible yet.

Every new discovery poses a new question. If RuBisCO cannot be modified, then how can we increase the efficiency of photosynthesis? Amanda Cavanagh (Biochemist of Illinois University) and her colleagues have achieved this by creating an alternative photorespiratory pathway which could improve the C3 crop productivity. The experiments were conducted in field tobacco plants and successful results were obtained. Three pathways were introduced with and without the transporter RNAi construct in tobacco plants. All enzymes in the new pathway designs were directed to the chloroplast. RNA interference (RNAi) suppresses the native glycolate/glycerate transporter PLGG1 to prevent glycolate from leaving the chloroplast and entering the native pathway. The pathway which used plant malate synthase and a green algal glycolate dehydrogenase (with RNAi) gave excellent results. There was a significant increase in the biomass(24%) and also increase in the light-use efficiency of photosynthesis by 17% in the field. They are trying to induce similar changes in other C3 grain crops as well. Let's hope that the research in this field will help us to decode our complex hunger equation and make the world a better place for our future generations

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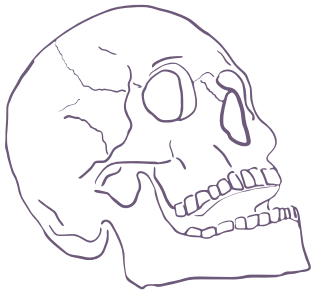

EDICTS OF A FORGETFUL MASTER

By Kamakshi

Science has, at its root a curiosity to know and to predict. To hope for and create a somewhat deterministic system. What else might be expected of this tiny planet that rebels with its decreasing entropy in this infinite universe of ever-increasing entropy. However, with the advent of chaos theory in mathematics and quantum physics, uncertainty and probabilities have become close acolytes to almost all fields of modern study. The human brain might be, albeit arguably, one of the most chaotic systems we have.

Within this wrinkly convoluted organ lies a region of much renown, the hippocampus. With appearances in many highly acclaimed studies, taking either the center stage or honorable mentions, the hippocampus is involved in memory formation, learning as well as foresight and prediction of future possibilities and events. With this much on its plate, it is inevitable that sometimes compromises are made, and our primal urge for order and patterns wins over.

When presented with information that is or appears to be falling into a pattern, be it the bus route you take, the daily filing of accounts or the checking of answer sheets, the hippocampus must make a decision – whether to prioritize remembering the details and creation of long-term episodic memories or the creation of patterns that allow prediction of future information that falls into this category. **When you create patterns, uniqueness is sacrificed.** A familiar situation would be you regularly reading your course book and while giving a test remembering the page layout and location where the answer is but not the exact content. **This is your hippocampus deciding that answers are often found in this "region" of the textbook and correspondingly engraining the overall layout of that "region" rather than the actual answer in your weary neurons.** While these are subconscious decisions that may occur, a conscious active effort may very well aid the hippocampus in switching gears.

An interesting study regarding this had human participants view a series of non-iterative images in regular patterns - beaches followed by mountains; bridges followed by forests etc. without being explicitly told so and thus allowing the brain to come up and figure out the patterns on its own. Once the patterns were established, new unrelated images were inserted into the mix, and then the participants were asked to recall and confirm which images they had seen before. For a significant portion, the better they were at recalling the image patterns, worse was their ability to pinpoint the exact pictures that they had seen or not seen. That is, as the brain focused more on patterns of beaches and mountains, the tendency to remember which mountains and beaches it had seen decreased. The brain made a judgement that it was more advantageous to be able to predict which image would show up next rather than remember the intricacies of the older ones.

Foresight guided by hindsight. In a primeval setting, this would be a pretty logical decision – imagine a group of hunter gatherers, moving from region to region in search of shelter and sustenance, they notice a recurring fauna pattern that they often find near springs and lakes or regions with abundant prey. For them, remembering the each and every detail of the regions may not be as beneficial as analyzing the spatial and cues associated with abundance. Predicting which paths and regions are associated with such cues could very well signify the difference between life and death.

In modern contexts, with such an influx of information and thousand of possibilities that surround us, it is somewhat understandable why memory fails us often. Remembering the path but not the strangers, remembering the songs but not the words, remembering the emotions but not the person. But as science and history have taught us, nothing is absolute, what we know today, we may deny tomorrow. For us beings, order is a distant muse and we are merely rebellious children of chaos.

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MICROPLASTICS IN HUMAN PLACENTA

By Kavyashree

A matter of great concern, this has gone too far. Scientists have found microplastic particles in the placentas of unborn babies. Microplastics are basically particles smaller than 5mm present in the environment . Scientists revealed that these particles are capable of carrying chemicals that could lead to long term complications or upset the foetus's developing immune system.

A group of scientists, using Raman micro spectroscopy, detected microplastic for the first time by examining the placenta of 6 women, of which four contained microplastic content. These babies are "cyborg" babies, with bits of microplastic incorporated in their body. The researchers found 12 microplastic fragments in four of six placentas. Three of these pieces were recognized as polypropylene, a plastic commonly used for packaging food. While other pieces were harder to identify, they appeared to be man-made coating paints, adhesive plaster, nail polish. A good percentage of these particles dealt with cosmetics and personal care products.

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The microplastic content-incorporated babies are no longer just made of human cells, but are a mixture of biological and inorganic material. Unlike bacteria, plastics are not biodegradable. Plastic can weaken the immune system making it more difficult for the baby's body to fight off other unwanted intruders. Other than this, microplastics have also been detected in the gastrointestinal tract of marine animals. Inside tissues, microplastics are considered as foreign bodies by the host organism triggering local immunoreaction, causing genetic, physical as well as mental disorders.

Through Raman micro spectroscopy, the Department of Life and Environmental Science, Universitá Politecnica delle Marche of Italy, provided a great analysis regarding this matter. During research, the experts used a strict plastic free protocol to deliver babies in order to avoid more contamination. While further research needs to be done on this subject, they concluded that microplastic probably entered the women's bodies through ingestion and inhalation and then translocated to the placentas. Having plastic in the body disturbs the immune system and can affect the development of children. These babies are pre-polluted even before their first breath . This again proves that we need to stop plastic pollution immediately.

EPIGENETICS & PSYCHOSTIMULANT ADDICTION

By Tejaswini

A chronic and relapsing disorder caused by compulsive intake of drug in spite of knowing its fatal consequences is known as drug addiction. It is a multifactorial polygenic disorder which does not conform to simple Mendelian Patterns of inheritance. Drug induced gene expression alteration in circuitry of brain is what is supposed to be the cause of transition from recreational to persistent drug abuse. Molecular mechanism works in promoting consistent change in gene expression and drug abusive response in case of long term drug exposure. There have been recent studies that elucidate the role of epigenetic mechanisms that play a role in the pathogenesis of psychostimulant induced addiction.

Epigenetics is defined as series of biochemical processes through which changes in gene expression are achieved throughout lifecycle of an organism without changing the DNA sequence itself. The term was coined in 1942 by Conrad Hal Waddington. Studies have found that epigenetic processes are important for normal cell development and differentiation, regulation of gene functioning through non mutagenic mechanism. Epigenetic mechanisms transduce environmental stimuli to promote stable alterations in chromatin structure that function to activate or repress gene transcription. Since subset of epigenetic changes are stable it makes them ideal mediators of vulnerability to addiction and drug induced brain maladaptation that underlie an addiction syndrome.

There are two general roles that epigenetic mechanisms likely play in addiction,

- Repeated exposures to a drug of abuse (including psychostimulants) in adolescence or adulthood causes addiction in vulnerable individuals by inducing stable changes in gene expression via epigenetic regulation of those specific genes. This epigenetic regulation involves alterations in the steady-state expression levels of one set of genes and also sensitization (priming) or desensitization of other genes without changing their steady - state expression levels.

- Epigenetic regulation mediates changes in the steady-state gene expression or the induction of genes throughout an individual's lifetime in response to a host of environmental agents, which helps determine that individual's vulnerability to drug exposure and addiction later in life.

Epigenetic mechanisms are reversible and dynamic in nature. They are chemical agents that alter modification of histones or methylation of DNA, miRNAs regulate psychostimulant induced gene expression profile in discrete brain regions and may prove potent candidates as therapeutic interventions.

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SILENTLY CREEPING IN: XENOESTROGENS

By Damayanti

We have been long aware of plastic pollution choking up the planet, or about chemical agricultural reagents accumulating in the ecosystem without perishing. While conscious efforts to reduce plastic usage and go organic are on the rise, significant effects of these synthetics on the human body have already been observed. Xenoestrogens are a group of such chemicals having serious effects on human biology.

Xenoestrogens are chemicals of non-biological origin that have a molecular structure very similar to that of human estrogens. Estrogens are natural hormones in humans that are important for bone growth, blood clotting and reproduction in men and women. It is also the primary sex hormone in females regulating the menstrual cycle and sexual characters. Xenoestrogens can bind to the estrogen receptors in the body, thus causing similar effects as estrogens would. However, they are not metabolised and eliminated easily, thus they accumulate in the fat cells of the body.

Xenoestrogens can have a range of serious effects on our physiology, ranging from precocious onset of menstruation, infertility, to obesity, endometriosis and miscarriages. It can also lead to cancers of the breast, testes or prostate. In addition to direct exposure, effects of exposure to a female or male fetus during development are irreversible.

These compounds enter our body through a variety of sources. Benzophenone and parabens used in sunscreen lotion or makeup are xenoestrogens. Many chemicals abundant in plastics used abundantly in food containers and bottles include xenoestrogenic chemicals. Organochlorine- containing fertilizers and insecticides like DDT and Lindane also have similar effects. Moreover, these organochlorine compounds accumulate in the fat of animals who consume such vegetation, thus they are passed up the food chain and enter humans via meat and dairy products.

Making conscious choices regarding usage of chemical cosmetics and consumption of meat and dairy helps reduce the intake of these chemicals. Also, usage of plastic food containers, especially heating food in plastic containers, should be avoided. While making these changes in personal lifestyle is certainly effective, we should also collectively aim at bringing about these changes at the industrial level.

SLEEP: UBIQUITOUS YET OBSCURE

By Ritika Mukherji

Weary with toil, I haste me to my bed,
The dear repose for limbs with travel tired;
But then begins a journey in my head
To work my mind, when body's work expired...
William Shakespeare Sonnet 27

Although these lines are more aptly interpreted in the context of sleeplessness, one cannot help but admire the scientific depth of the first four lines in isolation from the rest of the sonnet. REM (rapid eye movement) sleep, the state of sleep most widely associated with dreaming, requires the brain to be more metabolically active than it is while it is awake or while it is in the NREM (non-REM) sleep state.

We all sleep. Every being that has a nervous system sleeps. Even neurons in a Petri dish display periods of quiescence (neuronal 'OFF' states), associated with sleep. From nematodes, fruit flies and jellyfish to dolphins, whales and elephants; all organisms display a need to sleep, although the extent and manner in which they do so, varies considerably.

Dolphins, whales, otariid seals, ducks, frigate birds and some other aquatic mammals and birds show a phenomenon of sleep known as unihemispheric slow wave sleep (USWS), where one half of their brain shows electroencephalographic (EEG) characteristics of slow wave sleep (SWS - a feature of NREM sleep characterised by tall and fat waves), while the other half of their brain is awake. The eye opposite (aka contralateral) to the awake half, often remains open while the eye contralateral to the sleeping half remains closed. This is also many a times accompanied by limb movements on the side of the body that lies contralateral to the awake half of the brain. Dolphins need to keep swimming to be able to breathe occasionally, even while they sleep. Thus unihemispheric sleep allows them to do so. Dolphins and other cetaceans predominantly show unihemispheric sleep, and no conclusive evidence of classical REM sleep has been found in them till date. Pods of dolphins swimming in circles also display selective unilateral eye opening where the eye directed towards and beyond the pod member opposite to them remains open with the contralateral hemisphere being awake.

On the other hand, aquatic mammals such as seals can show bihemispheric SWS as well as REM sleep while they are on land. However, in water they switch to USWS. Northern fur seals show a characteristic swimming posture while in USWS. These seals lay on their side in the water with one side submerged in the water, and the other above the water surface. The eye, sensory vibrissae and limbs on the side of their body that is submerged remain active while they sleep, allowing them to keep swimming and also be aware of any predators approaching from inside the water. What allows these animals to display such elegant hemispheric switching behaviour between water and land, is a question that haunts many researchers.

Here it would be interesting to also talk about another means by which animals such as ground squirrels, some hamsters, mice living in cold regions and in unfavorable habitats conserve energy and enter a state of hypothermia (low body temperature). This state is known as torpor. Hibernation, a term one might be more familiar with, is actually a type of long-duration torpor. Although, a sleeping animal and a torpid animal may look similar; torpor and sleep are not the same. In fact, studies have shown that torpid or hibernating animals need to periodically emerge from hypothermia to catch up on lost sleep. Electrophysiological characteristics of recovery sleep post sleep deprivation and post torpor also show some similarities.

Sleep is therefore a ubiquitous phenomenon, but still obscure. Our understanding of sleep has advanced considerably in the last 70-100 years, and yet, we can't completely answer the questions of what, why and how sleep occurs.

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FAT BUT FIT

By Kritika

Obesity has always been correlated with the development of numerous diseases and pro-inflammatory states. However as the extent and depth of research increases, the complex variability in the expression of obesity and its consequences for the overall health of an individual is being uncovered.

For decades, society has considered obesity as a serious health issue and obese people have been ridiculed and labelled as lazy and gluttonous. Moreover, with the “condition” going from rare to a pandemic, obesity has achieved the status of a “disease” by top medical organizations such as the WHO, AMA and CDC.

As the third most obese nation in the world only after the US and China, the first thing that we need to understand is, 'what is obesity?'. An obese person is someone whose Body Mass Index or BMI (body mass divided by the square of the body height) is greater than 30. However, BMIs do not portray a true picture of a person’s physical health - consider smokers with a normal BMI or athletes with an obese BMI due to muscle mass.

Obesity has always been considered as the primary cause of the major plagues of modern society including heart diseases and diabetes. But an important fact that many of us forget while making such assumptions is that these diseases also develop in so-called “normal” people, while not everyone who is categorized as “obese” develops such conditions. Therefore, even though obesity can be considered as a risk factor, it cannot be labelled as a disease.

Recently, scientists have been working to study the relationship between obesity and metabolic health by examining genes, distribution of fat and its nature. Studies have shown that the excess visceral fat in the abdomen is associated with inflammation and fat buildup in some organs, in contrast to the subcutaneous fat which is stored under the skin and can even make you healthier than the people with “normal” BMI. Not only this, scientists have catalogued DNA stretches which are associated both with more fat (including a higher BMI and higher body fat percentage) and a lower risk of cardiac and metabolic diseases. It also included areas that control inflammation, energy expenditure and insulin signaling.

Many clinicians and researchers nowadays are also trying to focus more on the cardiac and metabolic markers of diseases such as triglyceride levels and blood pressure rather than just the BMI. It’s high time that the society also realizes that obese does not always mean unhealthy and that weight and health can be uncoupled.

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SETI & ENCOUNTER WITH ALIENS

By Debojani

SETI a.k.a. Search for Extraterrestrial Intelligence is a non-profit American research organization established in 1984, wholly dedicated to searching for extraterrestrial life in the universe. It focuses on receiving and analyzing signals from space, particularly in the radio and visible light regions of the electromagnetic spectrum.

A mysterious radio signal that seemed to have come from the nearest star to the sun- Proxima Centauri was reported in spring 2019 which was SETI's first bona fide candidate signal. It was detected by the Parkes telescope in Australia and hasn't been seen since.

If we receive signals perceived to be sent from aliens to earthlings, what happens next? Dr. John Elliot, joint coordinator of SETI says that once they are largely sure that an intercepted signal is an extraterrestrial message, they will share it openly to allow people all over the world to interpret it. With this protocol, it will be hard to stop anyone from answering the message. "I would have thought that there would be a reply made in some form at some point round the globe by someone with the required equipment", he says.

According to SETI, aliens are presumed to work within the laws of physics. To reach earth even using a craft from a nearby planet travelling directly towards Earth at half of light speed would take 2000 years to get here. Thus, an alien invasion isn't anticipated anytime soon. The trouble of extraterrestrial communication is that receiving alien signals would take years and sending replies will take another hundreds of years.

In 2019, a leaked Navy video on NBC news showed an unidentified spherical object flying low, skimming the ocean surface and disappearing underwater. In February 2021, in Ludhiana, Punjab, people noticed an illuminated object blazing through the night sky. It was oval-shaped with burning lights on both sides. Some suggested it was UFO {Unidentified Flying Object} while other skeptical individuals suggested it was a meteor. These incidents naturally sparked curiosity. Several branches of the U.S government have been investigating the events but still there's no proof of extraterrestrial activity but the incidents remain unexplained.

Attempting to communicate with extraterrestrials, if they do exist, could be extremely dangerous for humans. That's because any aliens we encounter in any form will likely be far more technologically advanced than we are. This is because most other galaxies are significantly older than ours.

https://www.seti.org/

AN OCEAN OF KNOWLEDGE

By Damayanti

The year was 1869. A strange disease broke out in the rural districts of Bengal- Burdwan, Bankura, Hooghly. The symptoms of the disease included fever with chills, and headaches. But this fever began to take lives, and assumed the form of an epidemic. In the post - mutiny rural India, there was no hospital or trained doctor for the treatment of the native Indians. The best possible medical facilities were reserved for the British administrators. Naturally, the death toll kept increasing.

This epidemic was of malaria. In the agricultural lowlands of Bengal, waterlogging was a common occurrence. This acted as a breeding ground for mosquitoes, and therefore malaria began to spread rapidly. However, the fact that malaria spreads through the bite of the female Anopheles mosquito was yet to be discovered (Sir Ronald Ross discovered that some 30 years later). Therefore, there was no practical method to prevent this disease. The British Government and the Zamindars (local land- owners) were too reluctant to take any significant steps against this epidemic. So, the number of people affected kept increasing. In this situation, a middle-aged, frail man came to Burdwan, the epicenter of the malarial outbreak. He rented a house there and set up a charitable dispensary for the patients. He also started distributing food, clothes and other bare necessities to the malaria- ridden people. He readily provided financial aid, whenever required.

Disappointed with the government's lack of action in this epidemic, this man went back to Calcutta and met the Lieutenant- Governor of Bengal, Sir William Grey. As a result of this meeting, a number of temporary clinics were set up throughout the affected regions, and a new and more responsible Civil Surgeon was sent to Burdwan. This being done, this man again returned to Burdwan. Accompanied by Dr. Ganga Narayan Mitra, this man visited the homes of the malarial patients, providing them with the required medicines. The only known cure for malaria back then was quinine (Chloroquine, now sold as Hydroxychloroquine). This drug was both rare and expensive, but he made it available to the patients, free of cost. This man's efforts saved a number of lives in that epidemic.

This frail man was Ishwar Chandra Bandyopadhyay. His vast knowledge in various fields had earned him the epithet "Vidyasagar"; (Ocean of knowledge). But the trait of his, that perhaps outshined his knowledge, was his kindness. It was this trait of his that drove him to crusade against numerous social evils. He will forever be remembered in Indian history as the man who fought for the causes for women at a time when society ignored their welfare. At a time when young girls were forcibly married off, only to end up as a widow a few years later, he got his own son married to a young widow. His constant campaigning for the cause of these widowed girls convinced Lord Dalhousie to pass the Widow Remarriage Act in 1856. It was his kindness that made him establish schools for young girls and challenge the Brahmin community about various religious malpractices. He spent the last 18 years of his life among the tribal communities of present-day Jharkhand, educating the girls.

Beyond these contributions, what makes him very relevant and significant in present times is his response to the malarial epidemic. The measures that he took and suggested to the government is a very good example of scientific handling of a public health crisis in India. Even after 200 years of his birth, action like these keep him alive in our hearts.

COVID-19: A BLESSING IN DISGUISE FOR THE ENDANGERED SPECIES

By Shivani Pandita

Covid-19 took the world by storm and shook the humankind to its core in 2019. In a short amount of time, it had swept across every continent. This global pandemic has had a knock-on impact throughout nations, and life as we know it had entered a dark period. It affected our personal relations in unforeseen ways. The COVID-19 pandemic has had far-reaching consequences that go past the sickness's propagation and containment attempts, including political, cultural, and societal ramifications. One of COVID-19's social ramifications is its impact on healthcare. The providers' experience with patient care and the delivery of care were the two major shifts in healthcare. Healthcare personnel struggled to keep up with rising demands, increased stress and workload, and a lack of protective equipment when the COVID-19 epidemic began.

This pandemic has had a significant impact on animals. While the rest of the world looked to be coming to a halt, nature appeared to be reclaiming her lost territory—wild animals near metropolitan cityscapes were taking advantage of the chance to venture outside the confines of their woodland habitats.

The air pollution level had significantly improved. The COVID-19 lockdown resulted in cleaner air. As industries, vehicles, planes, and ships, among other things, ceased to operate, the presence of smoke and carbon dioxide emissions in the air decreased dramatically. According to the Central Pollution Control Board of India, the air quality in Delhi-NCR, as well as all of India's metro cities, significantly improved. The visibility range significantly improved of this. With chattering birds and dazzling stars, the sky reclaimed its old untainted clear form.

Undoubtedly, Covid-19 is a human catastrophe. However, there may be a silver lining for some group of animals.

In April 2020, India's national aquatic animal, the Gangetic river dolphin, found primarily in India and Bangladesh along the Ganges-Brahmaputra River system. They are protected under Schedule I of the Indian Wild Life (Protection) Act, and the International Union for Conservation of Nature has listed them as an endangered species. Before lockdown was put into effect in the country, the carcasses of these species were found regularly on river banks as they were frequently targeted by poachers. But, after lockdown was implemented in the country, Dolphins were sighted in areas where they had previously not been observed owing to human activity. This was a positive factor for the dolphins in the river. They were seen more frequently in waterways that were cleaner and quieter. For many years, the endangered otter had been declining in Malaysia. But, during the COVID-19 lockdown period, otters were spotted in the normally crowded Putrajaya Lake and several other lakes inland.

The British Antarctic Survey had also reported sightings of critically endangered Antarctic blue whales off the coast of South Georgia, signaling a return to their historic summer feeding grounds. To conclude in few words, despite the tremendous negative effects of coronavirus around the world, the pandemic had a positive impact on the natural environment. Countries that halted citizen movement to prevent the spread of the coronavirus have seen a significant reduction in pollution and greenhouse gas emissions. On beaches and in parks, there was less litter found, and beach closures in some areas left the shoreline open to wildlife. The lockdown provided city people with a unique glimpse into the grandeur of nature and provided an excellent opportunity to channel their love for these beautiful creatures to improve conservation efforts.

SELF CARE
LEARNINGS FROM THE PANDEMIC

By Chaitanya Sunil Bhardwaj

As we all are trapped in our houses away from social gatherings, playgrounds, for some people gyms as well, we all have plunged deeper into a very important aspect of our life that always existed but we never paid much attention. I get shocked when I see my parents talking about leaving the book which is my laptop, for a while and try to relax a bit and this part is not shocking at all. The thing that shocks me is that I have no answer to that. I have forgotten how to relax now. Before COVID as we all were, if you remember trapped in the cycle of being best. Marks weren't the only thing now to pay attention to. You had to focus on being a circus, good enough to please others if not yourself.

Surprisingly the pandemic has made people realize that how important it is to take care of oneself. As much as it is important to take care f your body and physical fitness, it is equally important to make sure that we are mentally healthy too. The pandemic has rendered us unable to meet our loved ones, take care of them in this situation and most importantly feel connected. The social media has indeed helped us but let's be honest, haven't we all felt lonely at some point of time? May be on our birthdays or our friend's birthdays where generally we would be meeting them and enjoying the day?

In times like these it is extremely important to take care of our body and mind. The stress that we generally have due the fast times we live in has been increased several folds in the pandemic. When the scenario of socially calming yourself is removed it often becomes difficult for many people to relax down. I, however, kind of enjoyed the lockdown more than the normal dusty routine I generally used to follow. You can call it a privilege of being a hard core introvert.

One of the biggest things that we have all compromised in our lives is sleep. Making use of this time to trace back your sleep schedule is a good idea. Make sure to sleep at least 7 hours a day and say thanks to that amazing body of yours. Eat healthy. Now that you are home take care to eat food that is healthy and not the oily fried things you used to eat everyday near your school or college or houses. In these times when people are struggling for food 3 times a day, if you have food to eat, be thankful and put it to good use. Moreover if there is more food at your house do help others but don't waste it. Along with you health it is good to feel mentally at peace and believe helping others is the best way to close that void that many of us might have due to being away from our loved ones. Due to current situations it is not possible to get out of our houses. Normal stretching exercises and yoga are beneficial when it comes to maintaining physical and mental fitness. Meditation is an amazing method to feel calm and cool. It might be difficult to inculcate it in daily lives but slowly everything will fall in place and you will have a perfect morning routine without leaving your house.

Music can be a big get away from all this negativity. As for me my entire covid time was enjoyable due to majorly music. I played ukulele and it made me busy and happily busy to be precise. Learning new things like cooking, languages or painting etc. can be highly helpful. This is a perfect time to take up some good hobbies like reading and writing. Most importantly, even if you are alone, be connected with your loved ones as much as you can be because even if it's via a screen it is still a conversation. It is indeed a tough time for all of us but humming our way through anything is the spirit of being alive. Times are difficult but as long as we are alive everything is perfectly fine. Always be positive about the situations. Critical analysis of things is perfectly fine and is another aspect of being alive but always remember, being positive is the most important thing. Be positive, and be active wherever you are, we will all be smiling at the end.

Ardem Patapoutian

David Julius

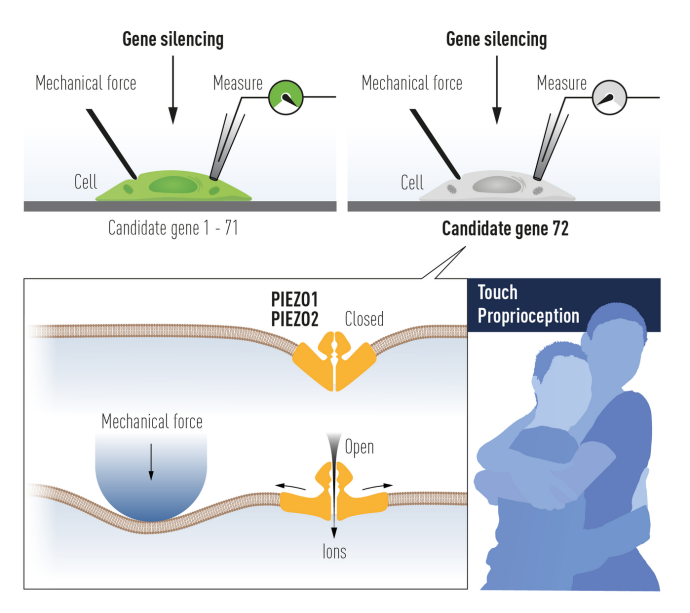
"It's true for many of our senses but maybe more so for touch and pain, we experience it but we take it for granted, you know, in terms of ... mechanistically."
- David Julius

NOBEL PRIZE:
PHYSIOLOGY /MEDICINE

David Julius
University of California, San Francisco, CA, USA

Ardem Patapoutian
Howard Hughes Medical Institute, Scripps Research, La Jolla, CA, USA

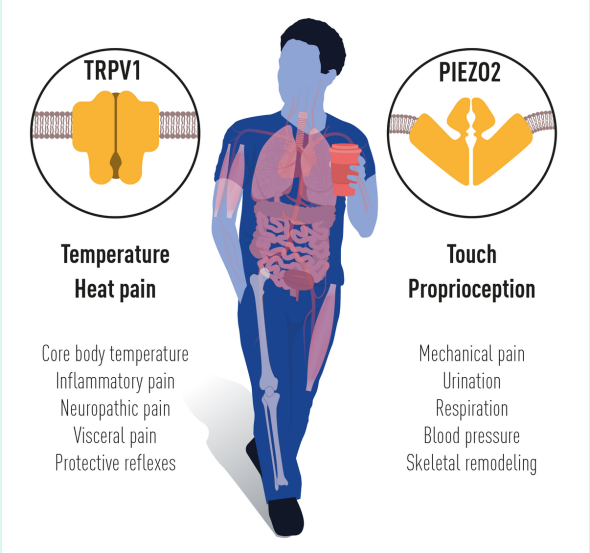
"for their discoveries of receptors for temperature and touch."

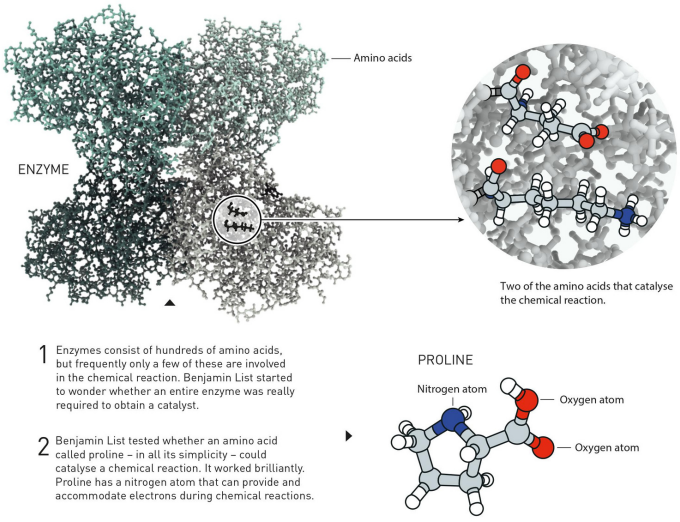


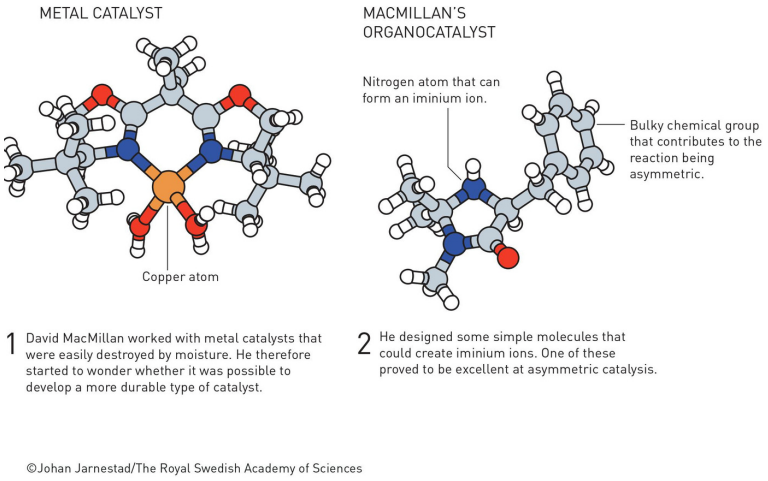
Using Capsaicin, a pungent compound from chili peppers, David Julius has tried to show the mechanism of the burning heat sensation as the compound helps to identify a sensor in the nerve endings of the skin which responds to the heat.

Using the pressure sensitive cells Adam Patapoutian
found novel class of sensors which respond to mechanical stimuli in skin and internal organs.

Thus, through these experiments the path towads the understanding of the sensing ability of our nervous systems towards heat, cold, mechanical stimuli, etc. was introduced which further has lead to the research in progress.







NOBEL PRIZE: CHEMISTRY

Benjamin List
Max-Planck-Institut für Kohlenforschung, Mülheim an der Ruhr, Germany

David W.C. MacMillan
Princeton University, USA

"for the development of asymmetric organocatalysis"

David W.C. MacMillan

Benjamin List

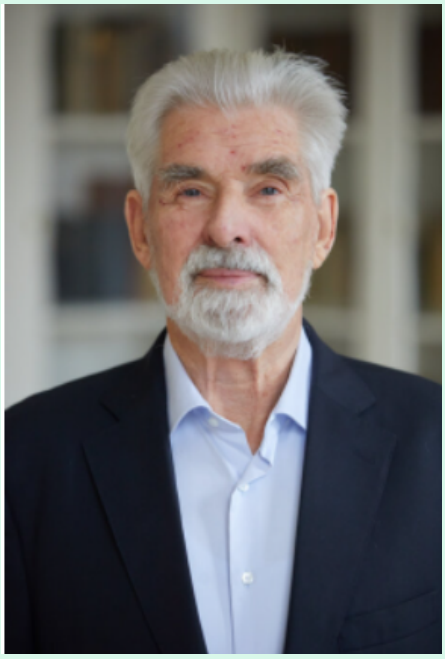
Benjamin List and David MacMillan independently developed a precise new tool for molecular construction known as organocatalysis in the year 2000.

Catalysts were long believed to be only of two types: metals and enzymes. The laureates' work conceptualised the area of organocatalsis and stimulated its development making it the third pillar of catalysis.

Organic catalysts have a stable framework of carbon atoms to which more active chemical groups such as oxygen, nitrogen, suphur or phosphorous can attach. Organic catalysts, moreover, have the ability to drive asymmetric catalysis, i.e, favour enantiomer over the other.

Organic catalysts are both environmentally friendly and cheap to produce. They have extensive use in industry as well as academia. these catalysts have not only helped the research into new pharmaceuticals but also has helped make chemistry greener.

Syukuro Manabe



Klaus Hasselmann

Giorgio Parisi

NOBEL PRIZE: PHYSICS

Syukuro Manabe
- *Princeton University, USA*

Klaus Hasselmann
- *Max Planck Institute for Meteorology, Hamburg, Germany*

"for the physical modelling of Earth's climate, quantifying variability and reliably predicting global warming"

&

Giorgio Parisi
- *Sapienza University of Rome, Italy*

"for the discovery of the interplay of disorder and fluctuations in physical systems from atomic to planetary scales"

Syukuro Manabe's work laid the foundation of current Earth climate models. He also provides evidence for the increased surface temperatures being a consequence of increased atmospheric carbon dioxide concentrations.

Klaus Hasselmann' s model establishes the link between weather and climate. His methods outline how human carbon dioxide emissions lead to increased temperatures. further verification is also proved for the relatively chaotic weather patterns when compared to more stable climate change patterns.

Giorgio Parisi discovered seemingly definite patterns in otherwise drastically complex systems. A rigorous mathematical analysis of complex systems allowed him to evaluate and uncover order in chaos. These inferences have significant contributions in a variety of fields spanning biology, chemistry, neuroscience etc.

Prose & Poetry

Flying Gold

There are things one does not recover from
There are things that still haunt us
Things that seem as cold as the ocean beneath
Things that are as infinite as the sky above
These are tiny things, gleaming the colour of gold

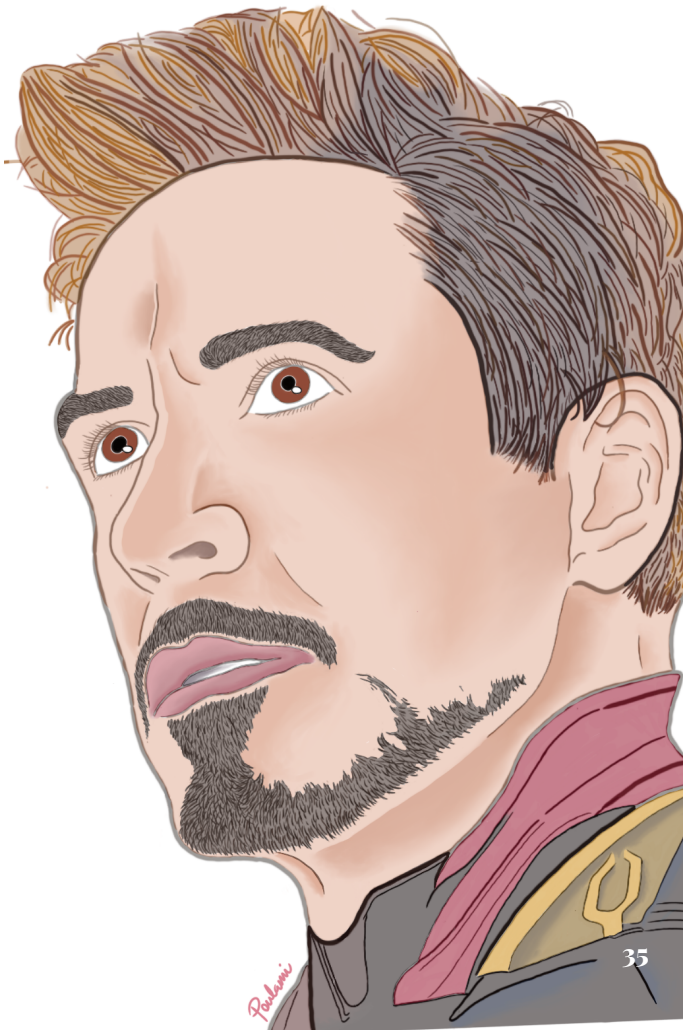
You flinch every time
Your eyes wide, darting like the hunted hare
And for a moment, the feral ancestors take over
Unhinged, ravenous, you unleash
The tiny things obey, they fly and they consume
The tiny things betray, neither yours nor mine

Red rain surrounds, my rain, our rain
I never saw it coming, tiny as it was
I just heard the shattering helmet and the whisper of the breeze
And I fell to Icarus welcoming me down below
And the sun lost another lover that day

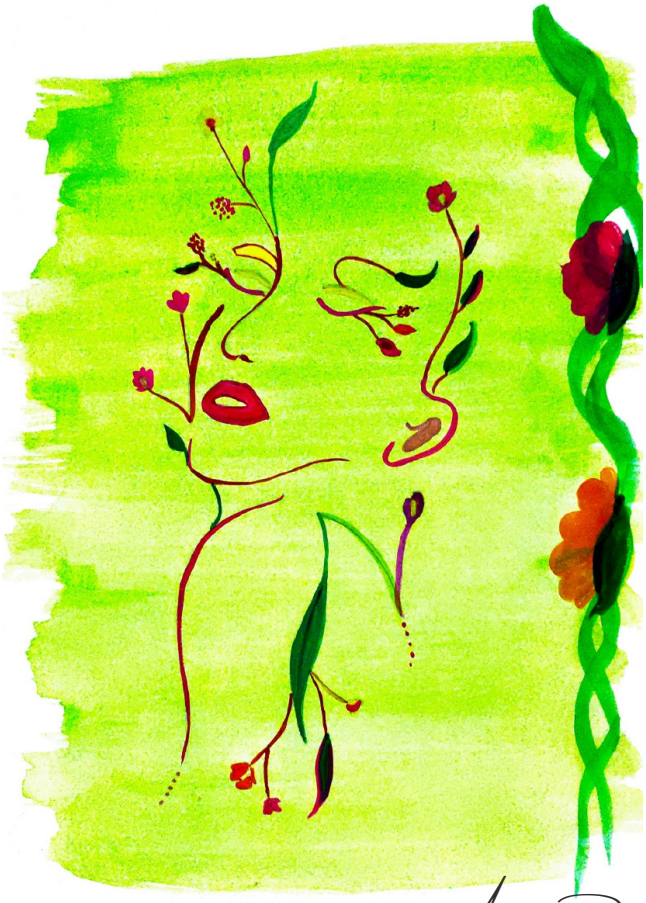
By Kamakshi

GALLERY

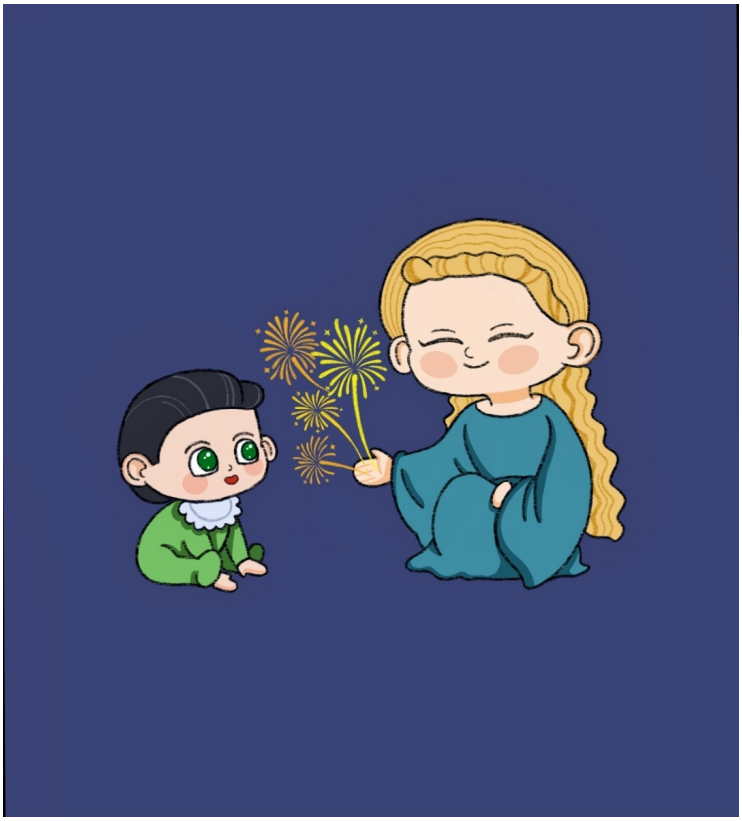
ILLUSTRATIONS
PAINTINGS
PHOTOGRAPHY



Poulami Mondal



Agrani Rana



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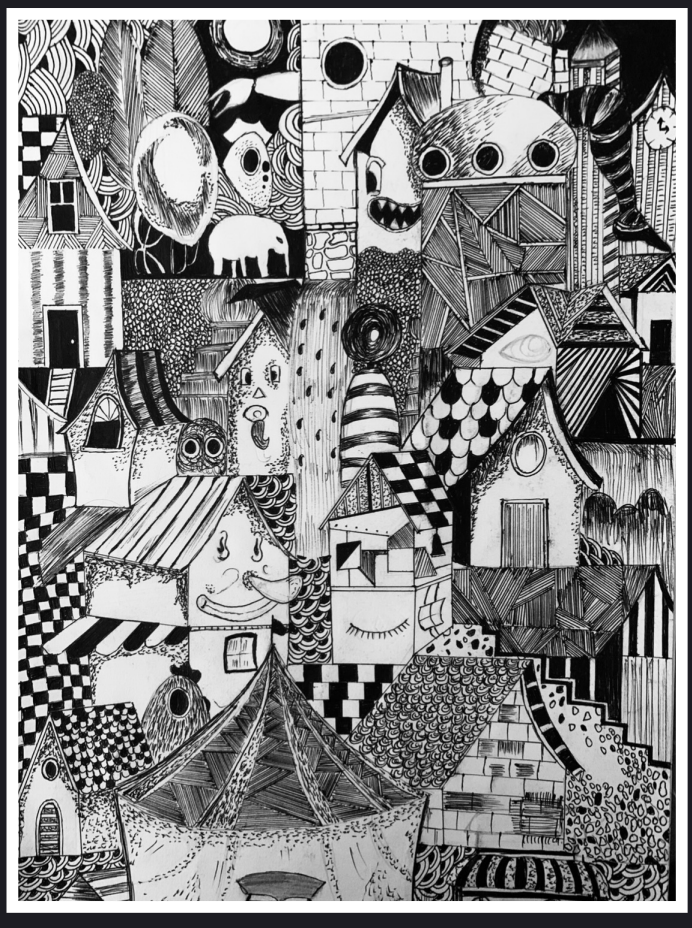


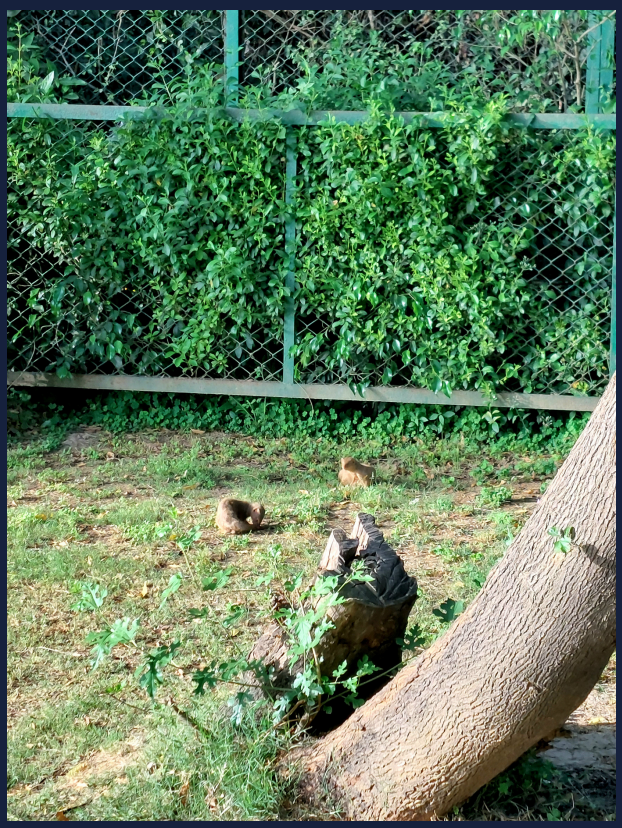
Faiha Shaji

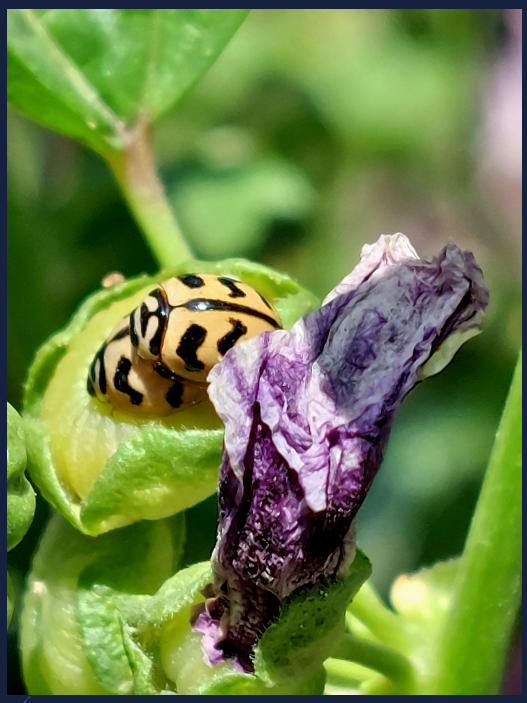
Poulami Mondal

Poulami Mondal

Liya Edwin

Kamakshi Singh






© Kamakshi Singh

Students' Achievements

III Year

Amita Singh

- Meritorious Award (2021-22), Universityof Delhi
- Second Position, Quizzard for Cognizant, Synapse - The Zoology Society, Miranda House

Anamika Yadav

- Second Position, Quizzard for Cognizant, Synapse - The Zoology Society, Miranda House

Annie Jimmy

- Vigyanshaala Kalpana Fellowship 2021

Atheena Abhayakumar

- Poster Presentation on Prediction of Ordered and Disordered Regions in the PE/PPE Family of MTB Proteins at the 2nd International Colloquium RMBPD 2022 – Deciphering Bioregulatory Mechanism in Health and Disease using “Omics” Approach organised by the Department of Zoology, University of Delhi
- Vigyanshaala Kalpana Fellowship 2021
- Meritorious Award (2021-22), Universityof Delhi

Geetika

- Secured 1st Runner up position in Parliamentary Debate Tournament organised by Daulat Ram College
- Best slogan award given by Synapse,MH on occasion of Teachers' Day

Bathula Sreeja

- Meritorious Award (2021-22), Universityof Delhi
- Second Position, Quizzard for Cognizant, Synapse - The Zoology Society, Miranda House

Kamakshi Singh

- Vigyanshaala Kalpana Fellowship 2021
- Poster Presentation on Design of multi-epitope based T-cell specific Influenza Virus Vaccine – An immunoinformatic approach at the 2nd International Colloquium RMBPD 2022 – Deciphering Bioregulatory Mechanism in Health and Disease using “Omics” Approach organised by the Department of Zoology, University of Delhi
- Poster Presentation at International Summit on Women in STEM by the Department of Biotechnology (DBT) and International Centre for Genetic Engineering and Biotechnology (ICGEB), Jan 2020
- Third position, MH Department of Zoology Colloquium on Nobel Prize winners, 2020

Kritika

- Second position, MH Department of Zoology Colloquium on Nobel Prize winners, 2020
- Second Position, February Fandom Quiz, VIT (27/2/2022)
- Meritorious Award (2021-22), Universityof Delhi
- Content writer, Raksha Jaipur (Oct 2020 - March 2021)
- Poster Presentation on Colours of Nature on Textiles: An Eco-friendly Approach at the Health and Research in Current Scenario: with special emphasis on COVID-19 virus genomics and pathogenicity organised by Sri Venkateswara College, University of Delhi & Phixgen Pvt. Ltd.
- Poster Presentation on Prediction of Ordered and Disordered Regions in the PE/PPE Family of MTB Proteins at the 2nd International Colloquium RMBPD 2022 – Deciphering Bioregulatory Mechanism in Health and Disease using "Omics" Approach organised by the Department of Zoology, University of Delhi

Nikita Chauhan

- Won first prize in Regional Poster Competition for COVID-19 Awareness organised by Unnat Bharat Abhiyan (RCI-IIT Delhi)

Poulami Mondal

- Second Position, Quizzard for Cognizant, Synapse - The Zoology Society, Miranda House

Ritika Mukherjee

- Rhodes Scholar
- Intern, Comparative Marine Mammal Brain Lab, Department of Ecology and Evolutionary Biology at the University of California, Santa Cruz, USA under PhD scholar Jessica Kendall Bar. Focus area: Studying marine mammal sleep, especially in Northern Elephant Seals.
- Intern, Mentor-Mentee Exploration & Exchange, Young Academy of India under Dr Ashwini Kumar, Asst. Prof. of Botany, Dr Harisingh Gour Central University, Sagar, India. Focus: Bioinformatics tools.
- Founder, InVolMEnt, a network for undergraduate STEM students for work experience opportunities.
- First position, MH Department of Zoology Colloquium on Nobel Prize winners, 2020
- Poster Presentation at International Summit on Women in STEM by the Department of Biotechnology (DBT) and International Centre for Genetic Engineering and Biotechnology (ICGEB), Jan 2020
- Guest Speaker: Sleep in Animals, Talk To A Scientist Forum, Sept 2021.
- International Biologging Symposium: Kendall-Bar, J.M., Mukherji, R., Lopez, C., Nichols, J., Lozano, D.L., Pitman, J.K., Holser, R.H., Beltran, R., Schalles, M., Field, C.L., Johnson, S.P., Vyssotski, A.L., Costa, D.P., Williams, T.M. (2021). Sleeping while diving: the first recordings of marine mammal sleep in the wild - Student Presentation. The 7th International Biologging Symposium Oct 2021. (Presented by Jessica Kendall-Bar)
- Extempore talk on Interview Tips: Maharaja Ranjit Singh, Armed Forces Preparatory Institute, Mohali, Dec, 2021.

Samridhi

- Participated in the Video making competition organised by Unnat Bharat Abhiyaan (UBA)
- Content writer (Research and Strategy team) in Girl Up together India

Yuktika Pandya

- Meritorious Award (2021-2022), University of Delhi
- Second Position, Quizzard for Cognizant, Synapse - The Zoology Society, Miranda House

II Year

Archana Hijam

- Third Position, MH Department of Zoology Colloquium on "Impact of Climate on Physiology"
- Meritorious Award (2021-2022), Department of Zoology
- Member, Mitsna - Non-Profit Student Organisation, Manipur
  Host & Editor, Science Corner, Mitsna
- Treasurer, North-East Society, Miranda House
- Social Media Domain, Aavya, Miranda House Chapter

Damayanti Dasgupta

- First Position, Science Exhibition Impulse'22

Faiha Shaji

- Meritorious Award (2021-2022), Department of Zoology

Khushi Mahajan

- Meritorious Award (2021-2022), Department of Zoology

Khushi Soni

- Meritorious Award (2021-2022), Department of Zoology
- First Position, Science Exhibition Impulse'22

Sakshi

- First position in Inter College Debate Competition in Impulse'22

Shriya Bhat

- Meritorious Award (2021-2022), Department of Zoology

Sruti Singha Mahapatra

- Blog head, Vivekananda Society
- Volunteer, Tempest (on behalf of Gender Sensitising committee)
- Volunteer, NSS Miranda House
- Event Manager (Intern) at Aashman foundation, India's first & the only NGO working for Single income family widows, running free women empowerment centers, free schools
- Active volunteer in Jatayu, people for the animal society of the Hindu College.

Unnati Singh

- Second Position, Science Exhibition Impulse'22

I Year

Arpita
- First position in Inter College Debate Competition in Impulse'22

Malavika Vijyanand
- First position in Science Exhibition Impulse'22
- Second Position, Baseline test
- Poster Presentation on 'Microplastics in human blood' for the finale at D S Kothari lab

Medha Shree
- Second position in Science Exhibition Impulse'22

Namrata Arora
- Third position in Cooking without fire in Deshbandhu college fest

Preeti
- First position in Science Exhibition Impulse'22

Pushkarini Rohidas
- Second position in Science Exhibition Impulse'22

Radhika Soni
- First position in Science Exhibition Impulse'22

Suman
- Second position in Science Exhibition Impulse'22

Titiksha Sharma
- Second position in Inter College Debate Competition Impulse'22

Vedaanti Sunil Bharadwaj
- Second position in Science Exhibition Impulse'22

Internship Experiences

Kamakshi Singh

I had the opportunity to join the Vigyanshaala: She for STEM fellowship during 2021. It was one of the most diverse experiences I have had, from relearning and reconceptualizing the fundamental scientific methods to hearing the adventures of a geologist in the icy fields of Antarctica. The program at its core is an initiative by Dr Darshana Joshi to encourage and support women in the ever-expanding scientific community. The fellowship was divided into 2 main phases where one was focused on helping us understand and explore potential fields of study that we could see ourselves pursuing and what exactly was the way to achieve them, the other phase gave us a platform to interact with some of the great minds in the scientific community and their supervision in developing a short-term research project of our own. Since all of this happened in the midst of the pandemic, it became an even greater intellectual exercise to figure out and execute our projects.

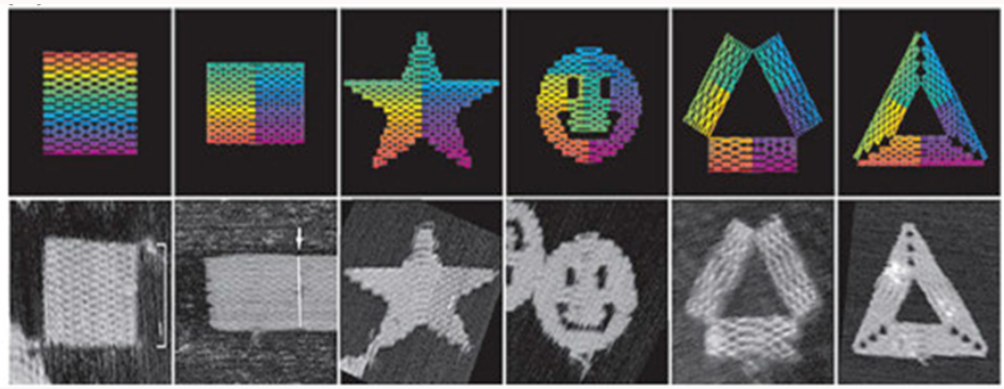
Krittika Arora

As a part of the DSKC Summer Internship 2021, I worked with Dr Monika Sharma and Dr Sadhna Sharma on the PE/PPE proteins of Mycobacterium tuberculosis. We used tools for the in-silico analysis to understand the basic characteristics of these proteins and predict their probable functions in the pathogenesis of the bacterium. We found that the PE and PPE proteins were expressed at later stages of infection in guinea pigs indicating their virulent nature. In addition, they had highly disordered regions and a large number of phosphorylation sites - qualities that may help the proteins to evolve faster masking the pathogen from host's immune response. Therefore, we hypothesized that the PE/PPE proteins have evolved as potential virulent factors and should be studied as potential drug targets.

QUIZADILLO

A Virulent Beauty

XY is the nanoscale folding of X to create arbitrary two- and three-dimensional shapes at the nanoscale. The process involves the folding of a long single strand of viral X aided by multiple smaller "staple" strands. These shorter strands bind the longer in various places, resulting in the formation of a pre-defined two- and three - dimensional shape as shown in the image. This technique has progressed past an art form and has found a number of applications from drug delivery systems to uses as circuitry in plasmonic devices. Identify the technique.

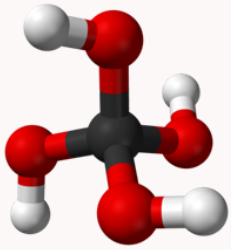


The Plastics

Mutations in the "X and Y" gene locus are accompanied by the malformation of Terminalia in adult drosophila. Male and female genitalia often remain inside the body, i.e., they lack the external genitalia just like this gene's namesakes, who were introduced to us as teen models in 1961 and 1959 respectively and have since been at the center of body image controversies. Identify the gene.

The Struggle

Orthocarbonic acid is sometimes called "X acid" (Molecular structure shown). However, the acid is hypothetical and highly unstable, and would decompose rapidly into carbonic acid (H2CO3) and water (H2O). The acid requires high pressure to be stable and therefore might be present in the centres of icy giant planets like Uranus and Neptune which have abundant carbon, hydrogen, and oxygen. What is the acid also known as and why?

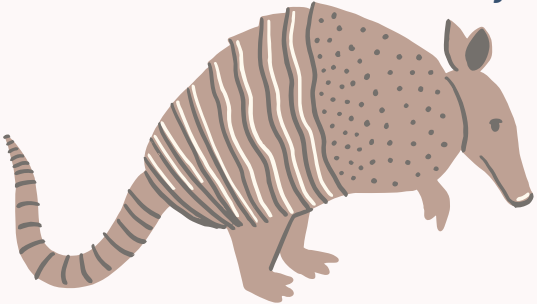


Thunderbolt

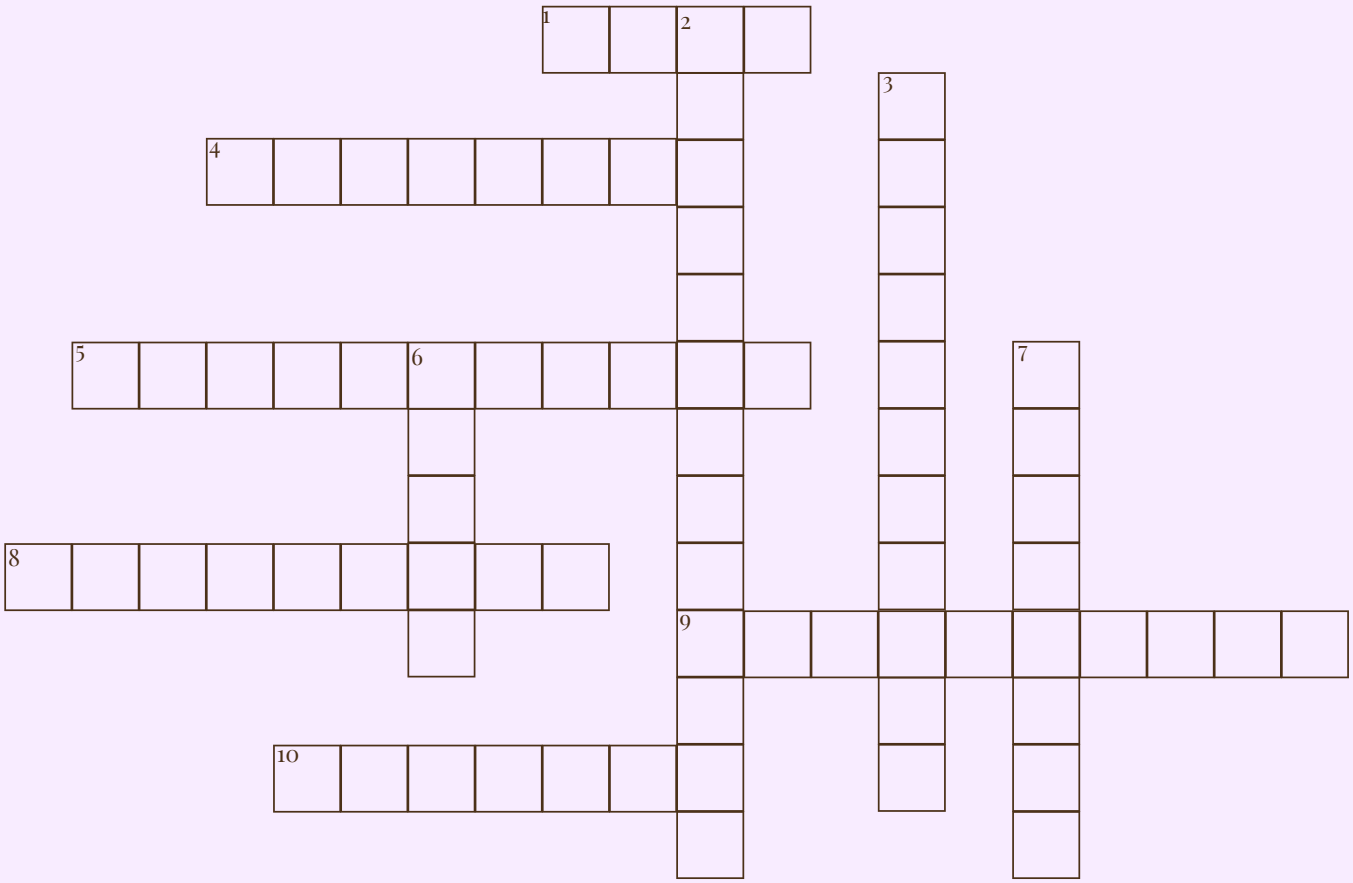
X is a dystroglycan-interacting protein which has an essential role in the precise interactions between the photoreceptor ribbon synapse and the bipolar dendrites. It is an extracellular matrix-like retinal protein first discovered in 2008 in Japan by Shigeru Sato et al. and named after Y, the protagonist of a 2019 mystery comedy film and one of the major mascots of Nintendo, due to its "lightning-fast moves and shocking electric effects". Give X and Y.

Perfectly Balanced

X is a genus of carnivorous brachyrostran abelisaurid dinosaur that lived in Brazil during the Santonian stage of the late Cretaceous Period. The generic name refers to a fictional supervillain, invented by Jim Starlin. The character's name is itself derived from the Greek word meaning "death". Give X.



A Zoological Carol

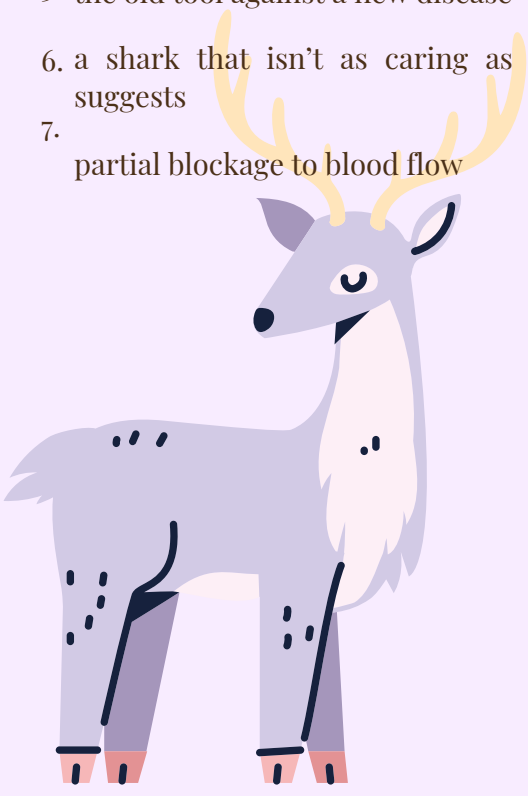


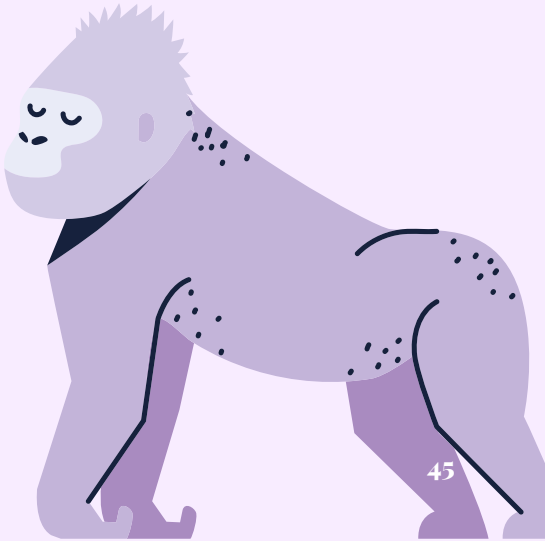
Down

2. study of animals rumored to exist, often calledcryptids(Loch ness monster, yeti)
3. the old tool against a new disease
6. a shark that isn't as caring as its name suggests
7. partial blockage to blood flow

Across

1. lethal cetacean predator in black and white
4. feature of salmons but not of eels
5. essential for electrical impulse conduction
8. sacrifical demise for the greater good
9. enzyme that catalyzes bioluminescence
10. process that creates the spiral shells of snails





Answers

Question Quests

1. DNA Origami
2. X: Ken; Y: Barbie; Gene: Ken and Barbie
3. Hitler's acid; its structure resembles a swastika
4. X: Pikachurin; Y: Pikachu
5. *Thanos*

A Zoological Carol

							[1]O	R	[2]C	A										
									R			[3]M								
			[4]A	N	A	D	R	O	M	Y		R								
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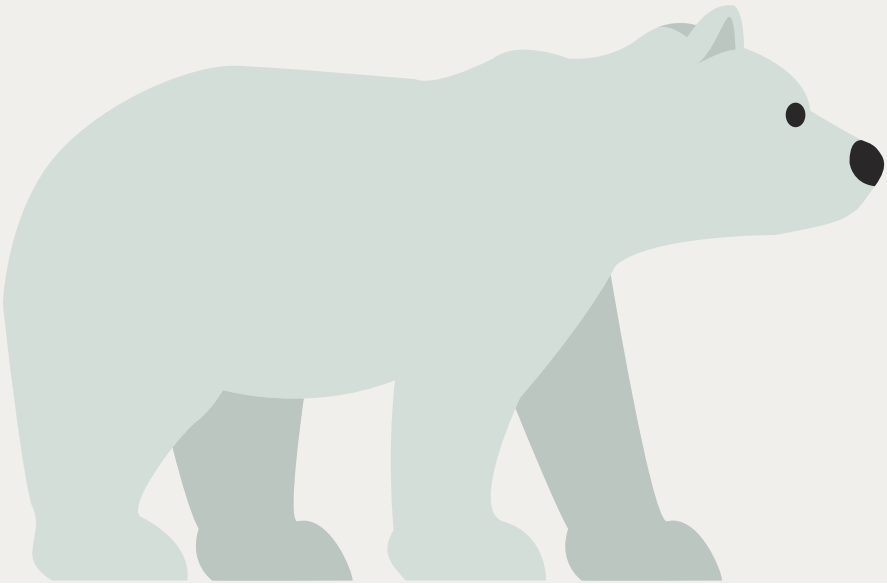

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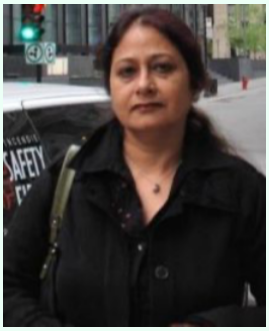
Associate Professor

Dr. Jyoti Arora
Associate Professor



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Professor

Dr. Monika Sharma
Associate Professor

Dr. Simranjit
Assistant Professor

Dr. Deepak Yadav
Assistant Professor

Dr. Pooja Suman
Assistant Professor

Dr. Yasha Yadav
Assistant Professor

Ms. Saba Zulfiquar
Assistant Professor

Dr. Shivani Yadav
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Dr. Deepika Rani
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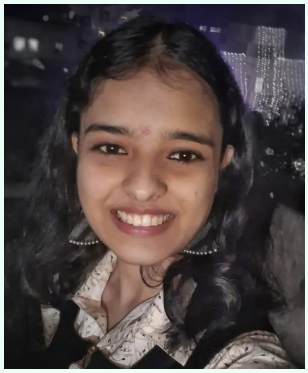

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EVOLVERE

THE ZOOLOGY DEPARTMENT MAGAZINE

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