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# NATURA ZOOLOGIA



THE OFFICIAL  
NEWSLETTER OF  
NATURAL SCIENCE  
ASSOCIATION  
ST. JOSEPH'S COLLEGE  
(AUTONOMOUS),  
BENGALURU



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# EDITORIAL

The Natural Science Association is a student association at St. Joseph's College (Autonomous). It aims at encouraging students' interest in all aspects of natural science through engaging, entertaining webinars and competitions that are conducted frequently. The association holds fun filled and informative polls, quizzes, posts throughout the year.

As a member of the Natural Science Association we are gratified for the opportunities of personality development, exposure to various contacts and enhancement of leadership skills, teamwork, communication skills and knowledge. The NSA journey in the year 2021 has been fruitful and truly a memorable one.

To make this news letter an informative read we have put together a few interesting articles by those who have had hands on experience in research, a review of what is new in the zoological field and some new discoveries. A small article and few interesting facts are discussed about two species that are endemic to India in 'Species of the Month'. The creative corner showcases the talent of the youth in our college. We hope that this article makes one more inquisitive and appreciative of our environment.

~Andrea Joanne David (20MCZO5),  
Selvapriya S(20CZBT17)



**Dr. M Jayashankar**  
Chief Editor



**Kishan Nag M P**  
Associate Editor

# ALUMNI CORNER



Being sure about not wanting to pursue the field of engineering or medicine after 12th, without hesitation the only college I applied to was St. Joseph's. I received a call soon after, got my admission and in no time was I attending classes. For the first time, I wasn't uncomfortable although it definitely was a whole new place for me. The culture and people here were entirely different from the ones I had earlier experienced. The teachers were very amicable and this made it all the more easier and quicker to love this place. My first year as an MCZ student was all about attending class and getting to know my departments while wandering the campus during my spare time. Fests like Prathibha and Visages

Fests like Prathibha and Visages brought us closer to college. The second year was more about socializing and meeting people apart from just our classmates. I learnt so much, discovered abilities and had loads of fun. Getting involved with clubs, events and organizing committees was a wholesome learning process for me. Second year was a breakthrough for me.

From participating in the student Council elections to becoming the General secretary of college was quite whimsical. This reassured me that I had a lot more to do in the final year. A frantic final year was not just balancing studies, work and relationships at college but also a turmoil of emotions and hard work. From running to labs, completing records, working on term papers, organizing fests and events and representing college to figuring out about "What next?" and finally ending our enjoyable three years of college life very abruptly due to the pandemic, college was indeed my happy place. Keeping in mind, my Natural Science family which had always been a warm place and a home I can come back to, anytime.

Though the farewell didn't do any justice, the journey was definitely something to live for.



~Bindushree V  
MCZ, BSc Batch 2017-2020  
Presently pursuing MSc at  
JSS College of Arts,  
Commerce and Science,  
Mysore

# REAL TIME RESEARCH

To silence the novel proteins and their functional responsibility in Cervical Cancer with *Rosmarinus officinalis*.

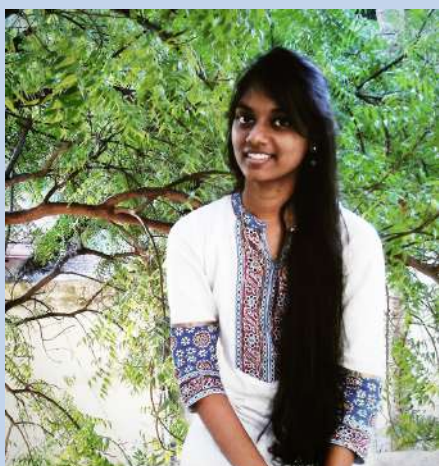
Cervical Cancer (CC) is a type of cancer arising from the Cervix. The cells divide rapidly and are potent enough to proliferate and infect other areas speedily. The symptoms are abnormal vaginal bleeding and intense pelvic pain, especially during sexual intercourse. CC is the third most frequent type of cancer in women with an estimation of 5,70,000 new cases in 2018 representing 6.6% of all female cancers. It is mainly caused by Human Papillomavirus (HPV).

E6 and E7 are proteins present in HPV that alter the cell cycle by switching off the tumor suppressor genes P53 and Rb in Endothelial Cells of Cervix resulting in CC. Surgical removal of Cervix or hysterectomy (removal of Uterus) is considered while Chemotherapy along with Avastin is the primary treatment for CC. Here, Bevacizumab (Avastin) binds with Vascular Endothelial Growth Factor A, (VEGF-A) which ultimately stops angiogenesis (the formation of new blood vessels). However, chemotherapy has adverse effects on an individual. *Rosmarinus officinalis* is an aromatic plant and a prophylactic agent which has therapeutic and anti-proliferating activity. It helps regulate the cell cycle by activating P53 and Rb while inhibiting VEGF-A.

~Aarthi Krishnan  
B.TECH. Biotechnology  
Bharathidasan University



# RESEARCH- AN EXPERIENCE



Research can be perceived in various ways. It can be boring for some, labor-intensive for others and rewarding for the ones who are captivated by it. Research to me is mainly, fascinating and fun. It is intriguing to read about the new developments in my area of research and invokes in me, wonder and an eagerness to ponder over the ways my work can be shaped to fit the hypothesized future targets. An inquisitive and

curious brain is the most needed when it comes to research and I think it is fine to have weird ideas as I believe that they can actually give way to the best findings. My experience in the research field would be nominal as I have just stepped into this field. In carrying out research, I have learnt a lot of things, not only in terms of subject knowledge but also life lessons. Research is not only about carrying out experiments and scrutinizing the acquired results. One learns to question, question in all possible ways to derive an answer or explanation for a problem. It also teaches one to think deeper and investigate a situation in an analytical manner. Research familiarizes one with patience and prepares for disappointments that come with unsuccessful results. It helps one understand that errors and failures are not the end and that there is always a solution. You just have to probe for it. It instills in one, the enthusiasm to search harder each time. It strengthens one's morale in working hard as good research always yields results. It helps one with time management, aids in building and bridging bonds and improves the efficiency of one's communication. It makes one independent and yet a great team player. These were some of my key learnings from research.

Research may sound exciting but it has a lot of challenges too. As a scholar working in the country, the major drawback is the inefficacy of the educational system to provide adequate knowledge about research and the skills to work in a research laboratory. Most educational institutes only concentrate on the grades and are least bothered about developing a student's skills for the field of scientific research.

The second drawback would be the financial issues. The schools and colleges do not provide the required knowledge and while trying to acquire it privately, the costs for each course is high.

A non-earning student from an average financial background will lose many good opportunities even if he/she has the interest to pursue research. The physical and emotional challenges faced by scholars in Indian research institutes are often overlooked, which demoralizes a person's ethic to continue his/her work.

Improving the educational system and providing additional areas for increasing hands-on experience at a nominal fee would greatly benefit research scholars. Taking appropriate measures to avoid injustice in this field and having efficient channels to address such issues would also encourage many more students to walk into the field of scientific research

~Christina Susan  
CSIR - Junior Research Fellow,  
Cancer Biology Laboratory,  
Sri Ramachandra Institute of Higher  
Education and Research

# What's new in the Zoological world?



## WHY THE DREAMING PHASE MATTERS

AUGUST 25, 2021. UNIVERSITY OF TSUKUBA

Researchers have found that flow in the brain capillaries, which is important for oxygen/nutrient delivery and waste removal, was increased during rapid eye movement sleep in mice. Adenosine A<sub>2A</sub> receptors might be at least partially responsible for this increased blood flow. These findings bring new hope for understanding the function of sleep and developing treatments for neurodegenerative diseases that involve the buildup of waste products in the brain, such as Alzheimer's disease.

## LEARNING FROM A 'LIVING FOSSIL'

AUGUST 30, 2021. MICHIGAN STATE UNIVERSITY



As we live and breathe, ancient-looking fish known as bowfin are guarding genetic secrets that can help unravel humanity's evolutionary history and better understand its health. For example, one particularly interesting gene is one that's used in developing the bowfin's gas bladder, an organ the fish uses to breathe and store air. Scientists believe that the last common ancestor shared bowfin and humans had air-filled organs like these that were evolutionary predecessors to human lungs.



# HOW A RACING HEART MAY ALTER DECISION-MAKING BRAIN CIRCUITS

AUGUST 30, 2021. THE MOUNT SINAI HOSPITAL / MOUNT SINAI SCHOOL OF MEDICINE

In an effort to understand how the internal state of the body influences the brain's decision-making processes, scientists analyzed the data from a previous study pre-clinical study. They found that two of the brain's decision making centers contain neurons that may exclusively monitor the body's internal dynamics. Furthermore, a heightened state of arousal appeared to rewire one of the centers by turning some decision making neurons into internal state monitors. Anxiety, addiction, and other psychiatric disorders are often characterized by intense states of what scientists call arousal: The heart races, blood pressure readings rise, breaths shorten, and "bad" decisions are made. In an effort to understand how these states influence the brain's decision-making processes, scientists at the Icahn School of Medicine at Mount Sinai analyzed the data from a previous study of non-human primates. They found that two of the brain's decision-making centers contain neurons that may exclusively monitor the body's internal dynamics.



## NEW CLASS OF HABITABLE EXOPLANETS REPRESENT A BIG STEP FORWARD IN THE SEARCH FOR LIFE

August 25, 2021. University of Cambridge

A new class of exoplanet very different to our own, but which could support life, has been identified by astronomers, which could greatly accelerate the search for life outside our Solar System. The researchers have identified a new class of habitable planets, dubbed 'Hycean' planets hot, ocean covered planets with hydrogen rich atmospheres which are more numerous and observable than Earth-like planets. Many of the prime Hycean candidates identified by the researchers are bigger and hotter than Earth, but still have the characteristics to host large oceans that could support microbial life similar to that found in some of Earth's most extreme aquatic environment.

"It's exciting that habitable conditions could exist on planets so different from Earth," said co-author Anjali Piette, also from Cambridge.

## THE FUTURE OF MEDICINE IS NEARER THANKS TO RESEARCHERS' INVENTION

August 5, 2021. University of Massachusetts Amherst



Researchers recently unveiled their discovery of a new process for making RNA. The resulting RNA is purer, more copious and likely to be more cost-effective than any previous process could manage. This new technique removes the largest stumbling block on the path to next-generation RNA therapeutic drugs.

"The real goal here," says Martin, "is to have a 'flow reactor,' or a continuous pipeline into which you can slowly feed the ingredients and have pure RNA continuously come out the other end."

## METABOLISM CHANGES WITH AGE, JUST NOT WHEN YOU MIGHT THINK

August 12, 2021. Pennington Biomedical Research Center

The findings appear in the journal *Science*. "As we age, there are a lot of physiological changes that in the phases of our life such as during puberty and in menopause.. What's odd is that the timing of our 'metabolic life stages' doesn't appear to match the markers we associate with growing up and getting older," said study co-author Jennifer Rood, PhD, Associate Executive Director for Cores and Resources at Pennington Biomedical Research Center.

"Some people think of their teens and 20s as the age when their calorie-burning potential hits its peak," Dr. Katzmarzyk said. "But the study shows that, pound for pound, infants had the highest metabolic rates of all."

# EXPERT'S EXPERIENCE

I work as a Postdoctoral fellow at Mayo clinic with a group of neurointerventional radiologists and scientists. Our objective aims at discovering new drugs in the treatment of stroke. A brain stroke results from the occlusion of a thrombus (or a blood clot) in the arterial vessels that carry oxygen supply to parts of the brain. Although the etiology and the origin of the thrombus can be plentiful, the consequences of an existing thrombus are detrimental, resulting in Stroke.

Tissue plasminogen activator (tPA) is the only drug approved by the FDA in the treatment of the dissolution of blood clots. Current statistics show that only a few patients (15%) who are present within 3-4 hours after symptom-onset will benefit from tPA therapy. Another standard mode of treatment relies on routine thrombectomy, a procedure involving physical removal of the clot and aspiration from the blood vessel using a catheter-guided device in adjunct with tPA. Therefore, we aim to understand the mechanism of blood clots and their interaction with new drugs for improved treatment modality, keeping in mind patient safety and well-being. In conclusion, we lean towards studying clot structure, composition and finding new targets for drugs, thus testing them via in vitro and in vivo models.

Santhosh Arul Ph.D.,  
Research Fellow, Mayo Clinic, Rochester,  
Minnesota, USA



# CREATIVE CORNER



Shot by  
Andrea Joanne David  
20MCZ05

*Xyleutes persona* is a moth of the family Cossidae. It is found in the Indian subregion, Sri Lanka, south-east Asia, Sundaland, Sulawesi, New Guinea and Queensland. The habitat consists of lowland forests.

ART  
using charcoal pencils, charcoal  
sticks and white gel pen  
CAROLIN ANTHURAJ  
20CZBT60

*Panthera leo* is a large native to Africa and India. The lion is an apex and keystone predator. The lion inhabits grasslands, savannas and shrublands. It has been extensively depicted in sculptures, paintings, on national flags and in contemporary films and literature.



# SPECIES OF THE MONTH

*Macaca silenus*, *Menura novaehollandiae*,  
*Menura alberti*

## *Macaca silenus*

Lion-tailed macaques have black fur. They have a grey mane around their face which is also their characteristic feature. They are also sometimes referred to as bearded monkeys. They have a small tuft on the tip of their tail. Their tail resembles a lion's tail which is where the name 'lion-tailed macaque' comes from. Males are larger than the females. Just like other macaques, these monkeys also have cheek pouches which can hold almost as much food as can fit in their stomach.



In the wild, lion-tailed macaques are only native to India. They live in the Western Ghats hills and mountains of southwestern India, they occupy the tropical rain forests and elevated mountainsides.

Their environment is rapidly changing due to human encroachment, wildfires, land conversion for crop plantation and other human activities. Due to this there is an observed change in their behavior and lifestyle. They change their eating and foraging habits to cope up with the changes in their habitat. Like feeding on non-native flowering *Maesa* plants or even coffee plants, they are consuming more insects and spend a lot more time foraging on the ground than they used to. Loss of habitat has also led to the decrease in number of these endemic mammals.

**Facts:**

**1) Lion-tailed macaques use at least 17 different vocal patterns, as well as body language to communicate.**

**2)They are extremely important for seed dispersal as they transport fruits in their cheek pouches.**

**3)They are classified as Endangered by the International Union for Conservation of Nature (IUCN, 2015), appearing on the IUCN Red List of Threatened Species. There may be fewer than 2,500 mature individuals left in the world.**

**4)When spotting a predator or a human, this animal will stay still without movement on top of a tree.**



# *Menura novaehollandiae,* *Menura alberti*

A lyrebird is either of two species of ground-dwelling Australian birds that compose the genus *Menura*, and the family Menuridae. They are named for the shape of their tail when spread in courtship display. In the so-called Superb Lyrebird (*Menura novaehollandiae*), the male's tail consists of eight pairs of ornate feathers which resemble a lyre when erect. They are most notable for their impressive ability to mimic natural and artificial sounds from their environment and the striking beauty of the male bird's huge tail when it is fanned out in courtship display. Lyrebirds have unique plumes of neutral-colored tail feathers and are among Australia's best-known native birds. They are ground living birds with strong legs and feet and short rounded wings. They are generally poor fliers and rarely take to the air except for periods of downhill gliding.

The superb lyrebird is found in areas of rain forest in Victoria, New South Wales and south-east Queensland. It is also found in Tasmania where it was introduced in the 19th century. Lyrebirds are shy and difficult to approach. When lyrebirds detect potential danger, they pause and scan the surroundings, sound an alarm and either flee the area on foot or seek cover and freeze. The superb lyrebird had already been seriously threatened by habitat destruction in the past. Its population has since recovered, but the 2019-2020 bush fires damaged much of its habitat, which may lead to a reclassification of its status from "common" to "threatened".



The lyrebird has been featured as a symbol and emblem many times, especially in New South Wales and Victoria (where the superb lyrebird has its natural habitat), and in Queensland (where Albert's lyrebird has its natural habitat)

## FACTS

- Lyrebirds mimic birds of prey to deter predators.
- Besides mechanical sounds, the male lures a mate with a complex natural song that uses bits borrowed by at least 20 other types of birds.
- The bird's brilliant mimicry is largely due to its syrinx, which is the most complex of any songbird.
- *Menura alberti* is smaller than *M. novaehollandiae*, and the male's tail feathers aren't as showy.
- Lyrebirds used to be called peacock wrens.
- A displaying male Superb lyrebird is on the back of Australia's 10 cent coin.





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