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SCIENCE SPECTRUM

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THE IIS UNIVERSITY



JAIPUR

(deemed to be University u/s 3 of UGC Act 1956)

KEOLADEO NATIONAL PARK

Keoladeo National Park formerly known as the Bharatpur Bird Sanctuary is situated in Bharatpur, Rajasthan. The diverse habitats are home to 366 bird species, out of which 230 species are resident, 379 floral species, 50 species of fish, 13 species of snakes, 5 species of lizards, 7 amphibian species, 7 turtle species, and a variety of other invertebrates.

The CUBE team visited the National Park on 20th Jan 2018 for the study of bird diversity.

I- LAB

Collaborative Undergraduate Biology Education (CUBE), JAIPUR

1. NAME: Intermediate Egret

Intermediate egret, median egret is a medium-sized heron. It is a resident breeder from east Africa across the Indian subcontinent to South east Asia and Australia.



2. NAME: Oriental Magpie Robin

The oriental magpie-robin (*Copsychus saularis*) is small passerine bird considered an Old World Flycatcher. They are distinctive black and white birds with a long tail that is held upright as they forage on the

ground or perch. They are known as cage birds.

3. NAME: Grey Heron

The grey heron (*Ardea cinerea*) is a long-legged predatory wading bird. A bird of wetland areas, it can be seen around lakes, rivers, ponds, marshes and on the sea coast. It feeds mostly on aquatic creatures which it catches after standing stationary beside or in the water or stalking its prey through the shallows.



4. NAME: Western Swamphen

The western swamphen (*Porphyrio porphyrio*). It is also known as the sultana bird. This chicken-sized bird, with its large feet, bright plumage and red bill and frontal shield is easily recognisable in its native range.

5. Jungle Babbler

The jungle babbler (*Turdoides striata*) are gregarious birds that forage in small groups of six to ten birds, a habit that has given them the popular name of "Seven Sisters" in urban Northern India. They feed mainly on insects, but also eats grains, nectar and berries.



6. NAME: Ruddy Shelduck

The ruddy shelduck (*Tadorna ferruginea*), known in India as the Brahminy duck, It has orange-brown body plumage with a paler head, while the tail and the flight feathers in the wings are black, contrasting with the white wing-

coverts. It is a mainly nocturnal bird.

7. NAME: Ring Necked Parakeet

It is large, long-tailed and green with a red beak and a pink and black ring around its face and neck. In flight it has pointed wings, a long tail and very steady, direct flight. Often found in flocks, numbering hundreds at a roost site, it can be very noisy.



8. NAME: Northern Shoveler



The northern shoveler is a common and widespread duck. This species is unmistakable in the northern hemisphere due to its large spatulate bill. This is a fairly quiet species. The male has a clunking call, whereas the female has a Mallard-like quack.



Stephen William Hawking, the Cambridge University physicist and best-selling author who roamed the cosmos from a wheelchair, pondering the nature of gravity and the origin of the universe and becoming an emblem of human determination and curiosity, died early Wednesday, March 14, 2018 at his home in Cambridge, England. He was 76.

- ❖ Coincidentally, Hawking's date of birth i.e. 8 January 1942 fell on 300th anniversary of Galileo's death and his death i.e. 14 March 2018 fell on 139th anniversary of Albert Einstein's birth.
- ❖ He did his B.A from Oxford University, M.A (Natural Science) and Ph.D. (Thesis title - Properties of Expanding Universe (1965)) from Cambridge University.
- ❖ His IQ test score was 162 which is more than Albert Einstein.
- ❖ His research field was General Relativity and Quantum Physics.
- ❖ He was suffering from Motor Neuron disease or Amyotrophic Lateral Sclerosis "ALS" from the age of 21 which causes him to require the use of a custom electric wheelchair and specialized voice module to get around and communicate.
- ❖ His many publications included The Large Scale Structure of Spacetime with G F R Ellis, General Relativity: An Einstein Centenary Survey, with W Israel, and 300 Years of Gravitation, with W Israel. Among the popular books Stephen Hawking published are his best seller A Brief History of Time, Black Holes and Baby Universes and Other Essays, The Universe in a Nutshell, The Grand Design and My Brief History.
- ❖ Professor Stephen Hawking received thirteen honorary degrees. He was awarded CBE (1982), Companion of Honour (1989) and the Presidential Medal of Freedom (2009). He was the recipient of many awards, medals and prizes, most notably the Fundamental Physics prize (2013), Copley Medal (2006) and the Wolf Foundation prize (1988). He was a Fellow of the Royal Society and a member of the US National Academy of Sciences and the Pontifical Academy of Sciences.

CUBE Team

How to save the planet? Try using less deodorant

Charu Pritwani
B.Sc. Sem IV



The deodorants, perfumes and soaps that keep us smelling good are fouling the air with a harmful type of pollution — at levels as high as emissions from today's cars and trucks.

That's the surprising finding of a study published last week in the journal *Science*. Researchers found that petroleum-based chemicals used in perfumes, paints and other consumer products can, taken together, emit as much air pollution in the form of volatile organic compounds, or VOCs, as motor vehicles do.

The VOCs interact with other particles in the air to create the building blocks of smog, namely ozone, which can trigger asthma and permanently scar the lungs, and another type of pollution known as PM_{2.5}, fine particles that are linked to heart attacks, strokes and lung cancer.

Smog is generally associated with cars, but since the 1970s regulators have pushed automakers to invest in technologies that have substantially reduced VOC emissions from automobiles. So the rising share of air pollution caused by things like pesticides and hair products is partly an effect of cars getting cleaner. But that breathing room has helped scientists see the invisible pollutants that arise from a spray of deodorant or a dollop of body lotion. The researchers said their study was inspired by earlier measurements of VOCs in Los Angeles that showed concentrations of petroleum-based compounds at levels higher than could be predicted from fossil-fuel sources alone. Concentrations of ethanol, for example, were some five times higher than expected. And those levels were increasing over time.

Source : Gouss et al., 2018

Berry gives boost to Cervical Cancer Therapy

▣ Devyani Naruka
B.Sc. Sem VI



Blueberries are rich in anti-oxidants and are considered as a super food. New study revealed that these berries are helpful to treat cancer. By studying human cervical cancer cell lines, researchers discovered that the cell group which received only blueberry extract had 25% decrease in cancer. It consists of a non-toxic chemical which could be used as radio-sensitiser that makes cancer cells more vulnerable to radiation therapy. Also, Resveratrol, a compound found in red grapes, could be used as radio-sensitiser for treating prostate cancer.

References : Dr. Yujiang Fang, University of Missouri-Columbia

Top 10 genes of medical genetics

▣ Mahima Bhardwaj
B.Sc. Sem VI

Gene encodes for proteins in the body. It has now become possible to read the sequence of bases in the DNA of genes which was impossible 50 years ago!

Here's the list of top 10 medically important genes:

- ❖ p53: It encodes for protein that has a role in suppressing tumours.
- ❖ TNF: codes for a molecule called tumour necrosis factor, which plays a role in killing the tumour cells.
- ❖ EGFR: Epidermal growth factor receptor is a membrane bound receptor protein often mutated in drug resistant cancer.
- ❖ VEGFA: Vascular endothelial growth factor A, promotes the growth of blood vessels.
- ❖ APOE: Encodes for protein APOE, associated with a risk of Alzheimer's disease.
- ❖ IL6: Interleukin 6 has several important roles in immunity.
- ❖ TGFB1: Transforming growth factor beta 1, controls the self proliferation and differentiation.
- ❖ MTHFR: Methylene tetra hydro folate reductase, helps to process amino acids.
- ❖ ESR 1: Oestrogen receptor 1 has impact in breast, ovarian and endometrial cancers.
- ❖ AKT 1: Encodes a signaling protein that phosphorylates other proteins to activate them.

This top 10 hits a reflection of the attempts to alleviate human suffering through medical genetics.

Source : <http://www.thehindu.com/sci-tech/science/the-top-ten-genes-of-medical-genetics/article21249095.ece> <https://www.nature.com/articles/d41586-017-07291-9>

Don't squad these mosquitoes

▣ Tanvi Agrawal
B.Sc. Sem II



Scientists report that to control the population of *Aedes aegypti* mosquitoes many male insects are becoming sterile. "Treat them carefully! You don't want to hurt them," said South Miami Mayor Philip Stoddard because only female mosquito bites and not male ones. Produced by the U.S. Company, Mosquito Mate, the mosquitoes are not genetically modified but instead get infected with *Wolbachia*, bacteria that only affect the insects and renders the male sterile. When these mosquitoes mate with wild mosquitoes (without *Wolbachia*), the females are not able to reproduce, thus cutting down the insect population over a period of time. *Aedes aegypti* mosquitoes, which are not native to the region, transmit diseases like Dengue, Zika and Chikungunya. Dengue causes fever, rashes, nausea and in some cases can be fatal, while Zika has been known to cause serious birth defects. For many years, scientists have been studying *Wolbachia*, looking for ways to use it to potentially control the mosquitoes that spread diseases to humans. When *Wolbachia* is introduced into *Aedes aegypti*, it can minimize disease transmission in people. *Wolbachia* is safe for humans, animals and for the environment. "It's all biological and very safe for the environment, there's no effect on other insects, there's no effect on humans or pets," said mosquito mate field operations manager Patrick Kelly.

References : The Hindu on 11/02/2018, www.eliminate-dengue.com

Bioartificial Silk Liver

■ Hitasha Vithalani
B.Sc. Sem II



researchers tested scaffolds made of mulberry silk fibroins, non-mulberry silk fibroins and a blend of two silk varieties in vivo and in vitro. Among these, the silk blend mixed in equal proportions was found to be more effective than the other two varieties tested individually. This blended scaffold showed many enhanced liver-specific functions such as increased albumin production, enhanced detoxification as well as urea synthesis. When implanted in animals, the scaffold was found to be biocompatible. It also showed a better ability to retain stable primary liver clusters that exhibited optimal size, higher proliferation leading to high cell density, prolonged cell survival and better functionality.

IIT Guwahati researchers have created a bio artificial liver model grown within a 3-D silk scaffold. This silk scaffold, a bio material, is capable of supporting growth as well as sustaining the functionality & distribution of liver cells. The scaffold is made by mixing mulberry and non-mulberry silk fibroins. The

The researchers are now validating the scaffold with primary liver cells and human stem- cell derived liver cells to pave the way for its use in liver tissue engineering. They can also be used for creating cirrhosis disease models for drug development.

*Source : The Hindu Newspaper
Research by Students of IIT Guwahati
and by Prof- Biman Mandal*

DIVORCE RUNS IN THE FAMILY ? MAY BE IT'S GENETIC

■ Monisha Karar
B.Sc. Sem II

It is believed that the behavioral pattern and personality of a person is determined by his/her rearing environment , their social background and parenting style , and thus we have seen that a child having divorced parents is more likely to get divorced in his/her near future. Based on this fact counsellors and therapists emphasize to improve interpersonal relationships amongst couple who are on the verge of divorce . A recent study carried out by Virginia Commonwealth University and Lund University in Sweden says that, genetics of biological parents have an impact on a person's decision



for divorce . Dr Jessica Salvator, author of this study, got a bunch of ideas to find out why divorces run in family. One of which was to improve the inter personal relations between a couple, that too only if the problem is not genetic. Furthermore, along with Salvator, Kenneth S. Kendler and colleagues Sara Larsson Lönn , John and Christina Sandquist conducted a study in Swedish population and observed that the adopted child shows

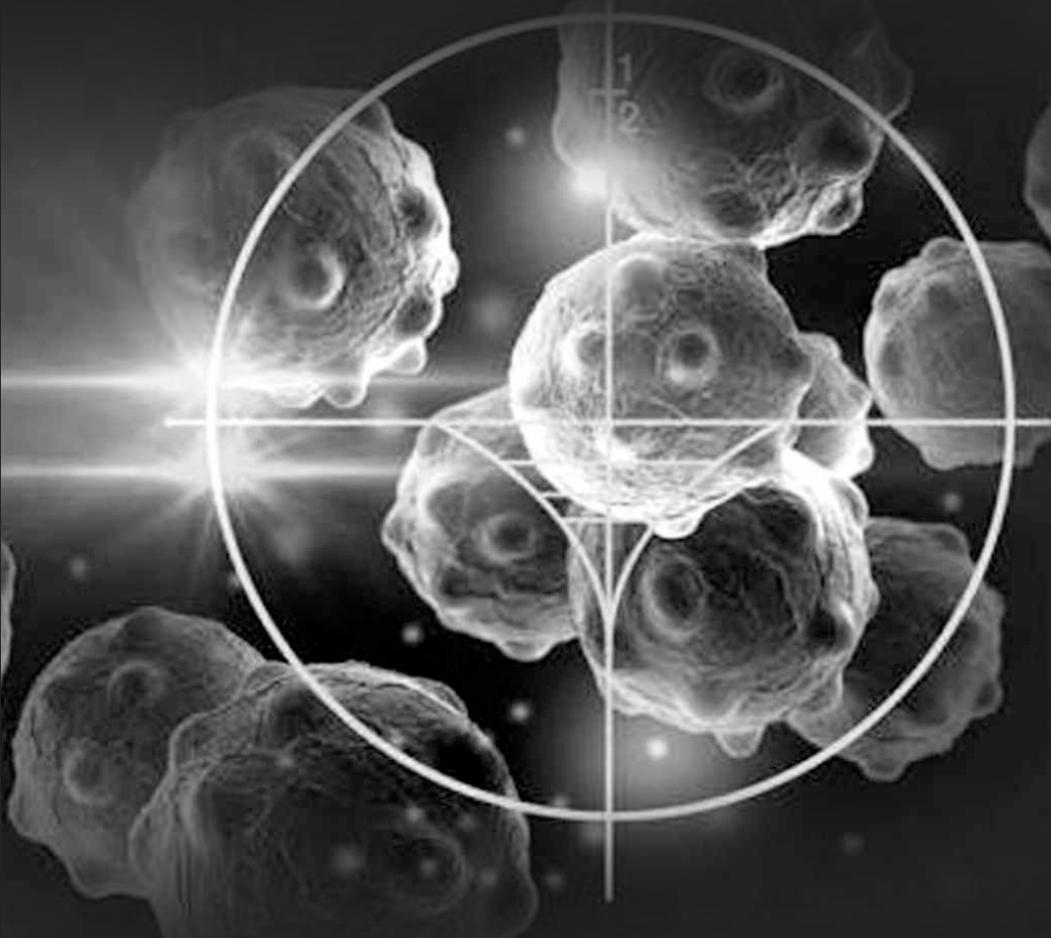
more resemblance to his/her biological parents, in regards with the history of divorce. This study can give us an idea about some basic genetic personality traits that are linked to divorce like high levels of negative emotions, low levels of constraint, etc. For say, if a person is highly neurotic (mentally unstable), he/ she tends to find their partner behaving more negatively too as per their own mental status.

Therefore, to combat with divorces, focusing on such personality traits would be beneficial to a great extent.

This study was supported by grants AA0235341 , DA030005 , K01AA024152 from US institutes of health, Swedish research council for health, Working life and welfare and ALF funding from Region Skåne. Divorce is a thing which sometimes good , sometimes bad but always affects a child's psyche.

Reference : www.independent.co.uk

Bacterial Imbalance And Breast Cancer



■ Ayushi Jindal
B.Sc. Sem II

In a newly published study, researchers have uncovered differences in the bacterial composition of breast tissue of healthy women vs. women with breast cancer. It was discovered for the first time that healthy breast tissue contains more of the bacterial species *Methylobacterium*, Bacteria that live in the body, known as the microbiome, influence many diseases. Most research has been done on the "gut" microbiome, or bacteria in the digestive tract, and suspected that a "microbiome" exists within breast tissue and plays a role in breast cancer but it has not yet been characterized. In addition to the *Methylobacterium* finding, they also discovered that cancer patients' urine samples had increased levels of gram-positive bacteria, including *Staphylococcus* and *Actinomyces*.

Breast cancer is cancer that develops from breast tissue. Signs of breast cancer may include a lump in the breast, a change in breast shape, dimpling of the skin, fluid coming from the nipple, or a red scaly patch of skin. It may occur in the male or female both.

Source : The Hindu Oct 8, 2017
News Releases Oct 6, 2017
Cleveland Clinic Research

Repeated food poisoning can lead to colitis

■ Shelly Sharma
B.Sc. Sem II

Colitis is a condition of inflammation in the inner lining of the colon. There can be several causes of colitis but one of the most common is infections, including those caused by a virus, parasite and food poisoning due to bacteria. Even low level gut infections can lead to severe colitis if they are recurrent. Scientists have

identified the molecular cascade that allows repeated infection by *Salmonella enterica typhimurium* to irreversibly accelerate gut inflammation.

Many strategies have been made in order to target this cascade, (such as zanamivir, an anti-flu drug) and serve as a therapeutic for bowel disease, colitis and crohn's disease. *Salmonella typhimurium* is a major source of human poisoning, causing more than 93.8 million infections and 1,55,000 deaths worldwide each year. Nevertheless, ST infections are minor and easily curable. Underestimating this pathogen's ability can result in a long term disease. If left unchecked, incremental effects of minor infection can lead to severe disease implications such as chronic gut inflammation.

Source : The Hindu, 31 Dec, 2017



National Conference on “ New Vistas in Chemical Research, Organized by Department of Chemistry, IIS University, Jaipur, 18-19 January, 2017



One day Seminar on “Intellectual Property Rights” Organized by Department of Biotechnology



Topic : Guest lecture and Quiz on Organ Donation



Department of Zoology, The IIS University, Jaipur

Topic : Symposium on Regulation & Management of Laboratory Animal Research



(Dr. Vikas Galav, Dr. Alka Galav, Dr. Ganesh Sharma PGIVS), Department of Zoology, The IIS University, Jaipur

Topic : Microwave and its application



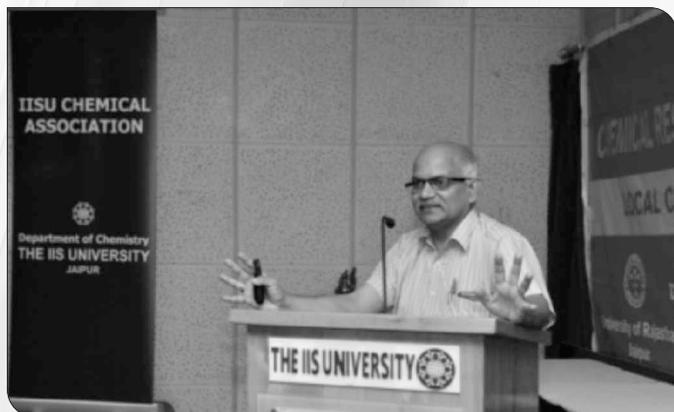
Prof. Deepak Bhatnagar, University of Rajasthan, Jaipur

Topic : Combating Biodiversity Loss: Targeting 2050



Dr. Soumna Datta Associate Professor & Head, University Maharani College, Jaipur

Topic : Anticancer agent design using structural biology



Dr. P.V. Bharatam,
Department of Medicinal Chemistry, NIPER, Mohali

Topic : Interplay of kinetics and thermodynamics in organic reaction



Dr. S.D. Samant,
Department of Chemistry, ICT, Mumbai

Topic : Scientific writing and literature survey for review article



Dr. Neelima Gupta,
Department of Chemistry, University of Rajasthan, Jaipur

Topic : Eco-restoration of Mansagar Lake



Prof. K. P. Sharma,
Department of Botany, University of Rajasthan, Jaipur

Technical Presentation on Vacuum Technology and their uses



Mr. P. Narendra Babu, (i2n technologies, IISc Bangalore)

Video conferencing with i2n technologies, IISc Bangalore



Mr. Sajid Khan, (i2n technologies, IISc Bangalore)

WHEN EVERY BREATH KILLS

■ Poornima Mohanan
B.Sc. Sem VI



The worry for ecotoxicology began with acute poisoning events in the late 19th century; public concern over the undesirable environmental effects of chemicals arose in the early 1960s with the publication of Rachel Carsons' book, *Silent Spring*. The appearance of humans in an area, to live or to conduct agriculture, necessarily has environmental impacts. The use of agricultural chemicals such as fertilizers and pesticides magnify those impacts. The environmental burden of toxic chemical include both agricultural and non-agricultural compounds. It is difficult to separate the ecological and human health

effects of pesticides from those of industrial compounds that are intentionally or accidentally released into the environment. Recently cotton belt of Maharashtra's Yavatmal district reported 21 deaths in 2 months as a result of pesticide poisoning and such frequent reports prove the hazardous effect of pesticides on human health.

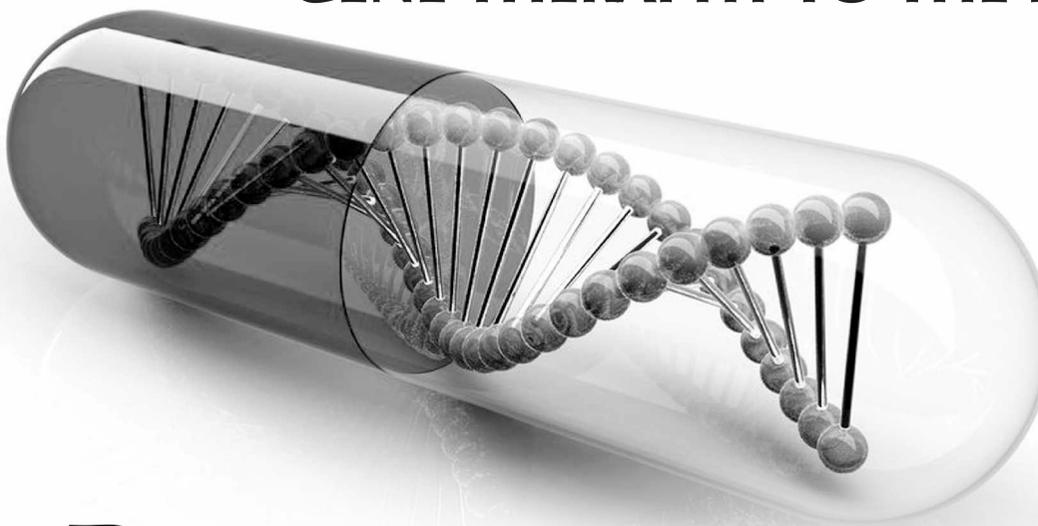
The long term health effects of pesticides:

- ❖ Many studies have examined the effects of pesticide exposure on the risk of cancer. Associations have been found with leukemia, lymphoma, brain, kidney, breast, pancreas, liver and skin cancers.
- ❖ It has neurological impact as it increases the risk of developing Parkinson's disease.
- ❖ A number of pesticides including dibromochlorophane and 2,4 - D has been associated with impaired fertility in males.
- ❖ Strong evidence links pesticide exposure to altered growth, birth defects and fetal death.
- * The branch of science that deals with the nature, effects, and interactions of substances that is harmful to the environment.

Source : *The Hindu* (9 December 2017)

GENE THERAPY TO THE RESCUE

■ Yashita Jain
B.Sc. Sem II



Researchers have used gene therapy to treat Pompe disease in mice, and healthy primates and this approach could be scaled up to help humans with the same condition. Pompe disease is an inherited disorder caused by the buildup of a complex sugar called glycogen cells of the body. The accumulation of glycogen in certain organs and tissues,

especially muscles, impairs the ability to function normally. Researchers have classified Pompe disease in three types, on the basis of their severity and the age at which they affect humans. These types are known as classic infantile-onset, non-classic infantile-onset, and late-onset. Pompe disease is a rare disease and serves as a neuromuscular disorder caused by mutation in an enzyme called GAA, which results in excess storage of glycogen throughout the body. Reports reveal that liver specific GAA delivery offers a more systematic reduction in glycogen buildup in mouse models by eliminating toxic accumulation in muscles, brain and spinal cord tissues.

Source: *Sato et.al., 2015*

Venom from Tropical Fish Could Lead to Pain Relief Medications

■ Dr. Lata Shahani
Department of Zoology



Source: Shutterstock/apathosaurus

Source: Shutterstock/John A. Anderson

Defensive venoms found in cobras or in sting rays causes pain but a unique venom has been found in tiny fanged fish called blennies which is pain free.

This fearless 1.5 three inch (4-7 cm) swimmers are timid and colorful fishes found in coral reefs of the Pacific Ocean. They are also kept in aquarium.

According to the findings of the scientist Bryan Fry, Associate Professor at University of Queensland, the venom is chemically unique called as fang blennies. This is an useful venom when injected in other fishes cause a sudden zonked out loss of coordination, slow movement and dizziness by acting on their opioid receptors. The venom has opioid peptides that act like heroin or morphine which inhibits pain. The fishes had two large grooved canine teeth which act as secret weapons and are perfect structures for delivering venom. The study was published in *Journal Current Biology*.

This unique venom offers a new avenue for development of novel pain killer medications. These fishes are highly threatened species in Great Barrier Reef. The Great Barrier Reef is currently dying due to the effect of climate change. There is an urgent need to protect the nature so that such species can be protected and their venoms can be used in pain relief medications.

Experiments were also done on lab mice who were injected with fish venom and no signs of pain was observed in mice. Opioids act as painkillers in central nervous system but outside this system they caused blood pressure drop. Fry said the findings bolster the need to protect the Great Barrier Reef and other fragile ecosystems. "If we lose the Great Barrier Reef, we will lose animals like the fang blenny and its unique venom that could be the source of the next blockbuster pain-killing drug,"

Source : www.thejournal.ie/pain-relief-fish-venom-3321101-Apr2017/

Taking a walk in the fruit fly's shoes

■ Nikita Sharma
B.Sc. Sem IV

"The insect's nervous system is comparable to that of a human's spinal cord and comprises a group of motor neurons, interneurons and sensory neurons, which respond to the outside world," says Swetha B.M. Gowda, a Phd student from Manipal Academy of Higher Education, and lead author of the paper in an e-mail to *The Hindu*. "While there is a good understanding of motor neuron structure and their connections to leg muscles, the role of interneurons in the regulation of walking is not explored."

The researchers examined the role of a gene called *Rdl* that responds to a neurotransmitter called GABA and inhibits the activity of the motor neurons. They observed that lowered levels of *Rdl* in leg motor neurons alters normal walking in terms of speed and step length. The results were recently published in *Proceedings of the National Academy of Sciences*.

The study also emphasises the role of the ventral nerve cord in normal walking and excludes any participation from the central brain. They observed that defects in the ventral nerve cord can lead to problems in different aspects of walking.

"The molecules that govern the development and behaviour of a fruitfly are remarkably similar to the molecules important for normal human development and behaviour.

Therefore, the pharmacological agents that are used to treat human neurological disorders can be studied in a fruit fly disease model."

"The fly's ventral nerve cord receives signals from the outside world and also from its brain. Its output is to control the muscles which result in movement. In this general sense, it is very similar to the spinal cord," says K. VijayRaghavan, the principal investigator of the group and corresponding author of the paper.

"Without brain input, co-ordinated walking can still take place in flies and in vertebrates too. But, visual inputs and other higher-level controls will of course be absent. As the ventral cord both receives signals and sends outputs; defects anywhere in this path can affect locomotion. The specific neurons where these defects are present, and when so, result in walking defects is what we seek to find. That can tell us both how and why defects can occur and how to fix them."

Source : <http://www.thehindu.com/sci-tech/science/taking-a-walk-in-the-fruit-fly-shoes/article22784461.ece/amp/Gowda.et.al.,.2018>

EXCURSIONS



1. Bharat Industries, Jaipur
2. Kumarrapa Handmade Paper making Institute, Sanganer, Jaipur
3. Nahargarh Biological Park, Jaipur
4. Carlsberg Brewery Plant, Sariska Wildlife Sanctuary and Silliserh Lake, Alwar
5. Science Park, Jaipur
6. Jantar Mantar, Jaipur
7. Omega Electronics Workshop, Jaipur
8. World Forestry Arboratum, Jaipur
9. Rajasthan Agriculture Reasearch Institute, Jaipur
10. Bharatpur Bird Sanctuary

Research Publications: International & National (2016)

Department	Total No. of Publications	Cumulative Impact Factor
Biotechnology	10	18.945
Physics	4	-
Chemistry	7	4.984
Zoology	7	4.27
Botany	3	-

Articles for next issue of Science spectrum may be submitted for publication at sciencespectrum@jisuniv.ac.in.
The guidelines for writing the paper may be downloaded from the IISU website.



Achievements 2016

Faculty



Prof. Raakhi Gupta
Chemistry

- **Women's Progression Award-2017** presented by Bulletin Today, Evening Daily News Paper
- **Certificate of Recognition** awarded by Innovinc International and Organizing Committee members of World Chemistry 2017 for oral presentation on World Chemistry Conference and Exhibition, organized at Rome, Italy
- **Avantika Shikshak Samman**, by Avantika (A Group of Contemporary Artists & Intellectuals, New Delhi)

Students

Faculty/Students Cleared NET



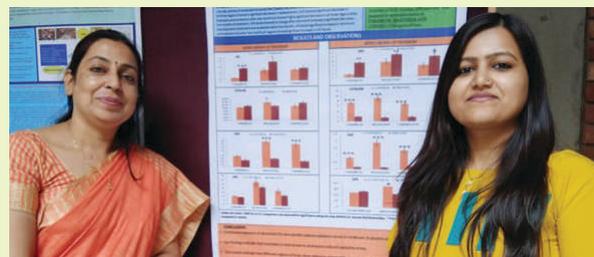
Arti Meena
Physics
Cleared CSIR-NET



Shweta Burdak
Physics
Cleared CSIR-NET



Surabhi Kumawat
Botany
Cleared CSIR- NET (JRF)



Lata Shahani and Nisha Rathore
Zoology

II Prize in Poster presentation in National Conference on Recent Trends and Advances in Environmental Issues, Awareness & Health, Jaipur 2017



Ms. Angelina Mary
Chemistry

II Prize in oral presentation in National Conference on "New Vistas in Chemical Research" on 18-19 Jan, 2017



Anushree Rathore
Chemistry

II prize in poster presentation in National Conference on "New Vistas in Chemical Research" on 18-19 Jan, 2017



Diksha Gopaliya
Chemistry

Won Best Quizer Award in University Maharani College Chemistry Olympiad 2016-17, Dated 10 Feb, 2017



Paridhi Jain, Tamanna Balwada, Shweta Soni, Surbhi Kumawat and Swasti Verma

Stood II in Nature Quiz conducted by the Department of Forest and Wildlife, Government of Rajasthan.



Vishakha Garg



Ruchi Paliwal



Sakshi Jain



Diksha Gopaliya



Tamanna Balwada

Won III Prize in University Maharani College Chemistry Olympiad 2016-17, Dated 10 Feb, 2017



Jyoti Yadav
Chemistry



Preeti Rani
Chemistry

III prize in poster presentation in National Conference on "New Vistas in Chemical Research" on 18-19 Jan, 2017

Achievements 2017

Ph. D Awards (The IISU)



Shivangi Goyal
Biotechnology
(Dr. Sreemoyee Chatterjee)



Sudesh
Chemistry
(Dr. Varsha Goyal)



Asha Gurjar
Chemistry
(Dr. Pragya Sinha)



Manjinder Kour
Chemistry
(Dr. Raakhi Gupta)



Neha Tiwari
Computer Science & IT
(Dr. O.P. Rishi)



Devika Chhachhiya
Computer Science & IT
(Dr. Manish Gupta)



Geetika Vyas
Computer Science & IT
(Dr. Amita Sharma)



Ruchi Nanda
Computer Science & IT
(Prof. K.S. Sharma)



Sheetal Topno
Geography
(Dr. Smriti Ashok)



Rena Mehta
Home Science
(Prof. Pradeep Bhatnagar)



Preeti Singh
Home Science
(Dr. Radha Kashyap)



Savina Kumari
Home Science
(Dr. Jyoti Gour)



Release of 7th Issue of Science Spectrum

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