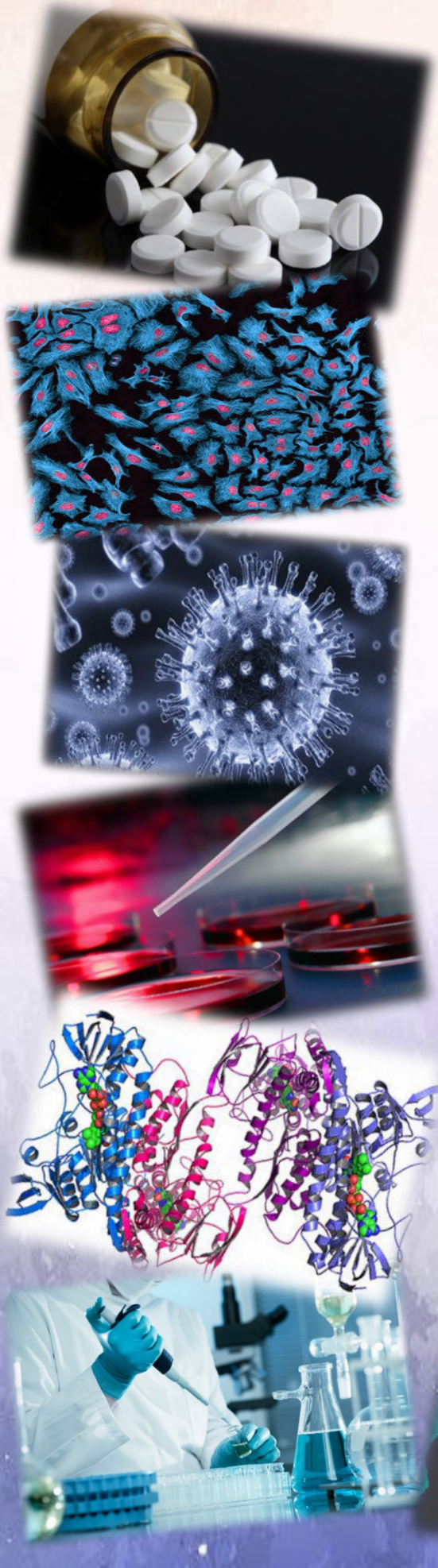
St. Xavier's College - Autonomous Mumbai



Calendrome

2016

ISSUE NO: 6

EDITORIAL TEAM

Percival D'gama

Joel John

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Sheryln Caldeira

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Akeeth Pinto

The Editorial Desk.....

Dear readers,

It gives us immense pleasure in presenting to you the Palindrome magazine, a vision nurtured and developed by our Department for years. Any educated society is incomplete without adequate time investment in informative articles for unleashing a person's creativity which is a prerequisite through a proper medium.

Palindrome is an enterprise having an educating experience with just the right amount fun. This magazine reflects and exemplifies the daunting but delightful and entertaining but educating expedition of our festival. We have tried our best to make sure this memoir helps you in recapitulating your eventful journey in PGDBT, St. Xavier's college. It is a compilation of student's life experiences, projects, articles and comic strips to tickle your funny bone.

This magazine is an immense effort put forward by the students of PGDBT and is also a specimen of their creativity. We hope your experience throughout will be pleasant. We would like to extend our heartfelt gratitude to our dear professors who supported and motivated us from the very commencement to the completion of this expedition. .

- Editorial Team

FOREWORD

We need to hear the voices of those who think technology has something to offer so that these can resonate to others and be part of a chorus that is able to make informed opinions and produce sustained action. Palindrome magazine in its 6th Year of publication is a compilation of well researched thoughts on the impact of Biotechnology on society. This periodical is a manifestation of a well coordinated effort right from deciding the theme, writing articles, compilation of research projects , editing and designing by the students of Semester IV . Each of the articles have a connection — from a thread to a rope — that links each tale to technology and society the world of Biotechnology as well as the spirit of evolving science from a student's point of view.

This experience is definitely going to be an enriching one for the students who are going to enter the competitive global society of Science. The soft skills, scientific communication skills, creativity and intense conceptual learning over a period of four semesters will help each one of them to be assets to the world of Biotechnology.

Wishing each one of the students the very best in life.

Dr. Shiney Peter

Ms. Norine Dsouza

Dr. Biswaprasun Chatterji

OUR HERITAGE

St. Xavier's College, Mumbai was established in 1869 by the Society of Jesus, an organization started by St. Ignatius Loyola. The UGC has conferred the College with coveted award of "College of Excellence" in 2014. In 2015, the college has been conferred "STAR COLLEGE AWARD" by the government of India, Department of Biotechnology (DBT), New Delhi. The NAAC has accredited the college with an A grade with a GPA of 3.63/4.

ABOUT THE DEPARTMENT

The post graduate department of Biotechnology at St Xavier's College aims at preparing academically sound students with a regard for non- scholastic affairs. The autonomous system aims at inculcating in the students the skills of current advancements in the field of Biotechnology

PALINDROME

Palindrome is an intercollegiate Annual Fest held in the campus of St. Xavier's College by the students and the faculty of the Post Graduate Department of Biotechnology. The purpose of the event is to provide a platform to the Students of Biosciences to bring out their creativity and non-scholastic potential besides the fun element of the festival.

FEATURES

- Beyond The Lab
- Career Calling
- Scientist At Work
- Palindrome Mania

"Leaders become great not because of their power but, because of their ability to empower others"

John C. Maxwell

A glimpse through our leader's vision.....

An Interview with Dr. Vivien Amonkar, Head,PGDBT

How did the Biotechnology Department come into effect? What was your role in the scheme of events?

Earlier, as all Bioscience students were eligible to undertake the Mumbai University , PG Biotechnology course , many students of our college, after completing their graduation, would join other institutes for Biotechnology. Hence, the college Management conceived the idea of forming a Post graduate Biotechnology Department. In the beginning, I was hesitant, when asked to head the nascent department, due to my duties as the Head of Microbiology Department as well as the Vice Principal of Academics. But the Principal's belief in me and my experience made me take up the position. The idea was to create a course that will enable students to utilize their understanding of Biological sciences in learning global Biotechnology skills. The first problem we faced was that since we got our permissions in August, most students had already taken admission elsewhere. However, the students of our first batch amazed me during the period of the course with their intelligence, sincerity and their quality work. All of them are highly successful and role models for the present students. We also faced a lot of hardships with respect to the faculty, however professors from other departments of the college contributed to run the course efficiently.

In your time how did you contribute to the growth of the Biotechnology Department?

I am someone who is passionate about and strives for excellence in academics. I think it is my quality that I make people work very hard and that has been instrumental in molding the students to work with sincerity and intelligently. I used to interview people at the beginning of the course and I told them not to join the course if they were only interested in a degree or if they were not prepared to work hard. My aim was to create quality biotechnologists.

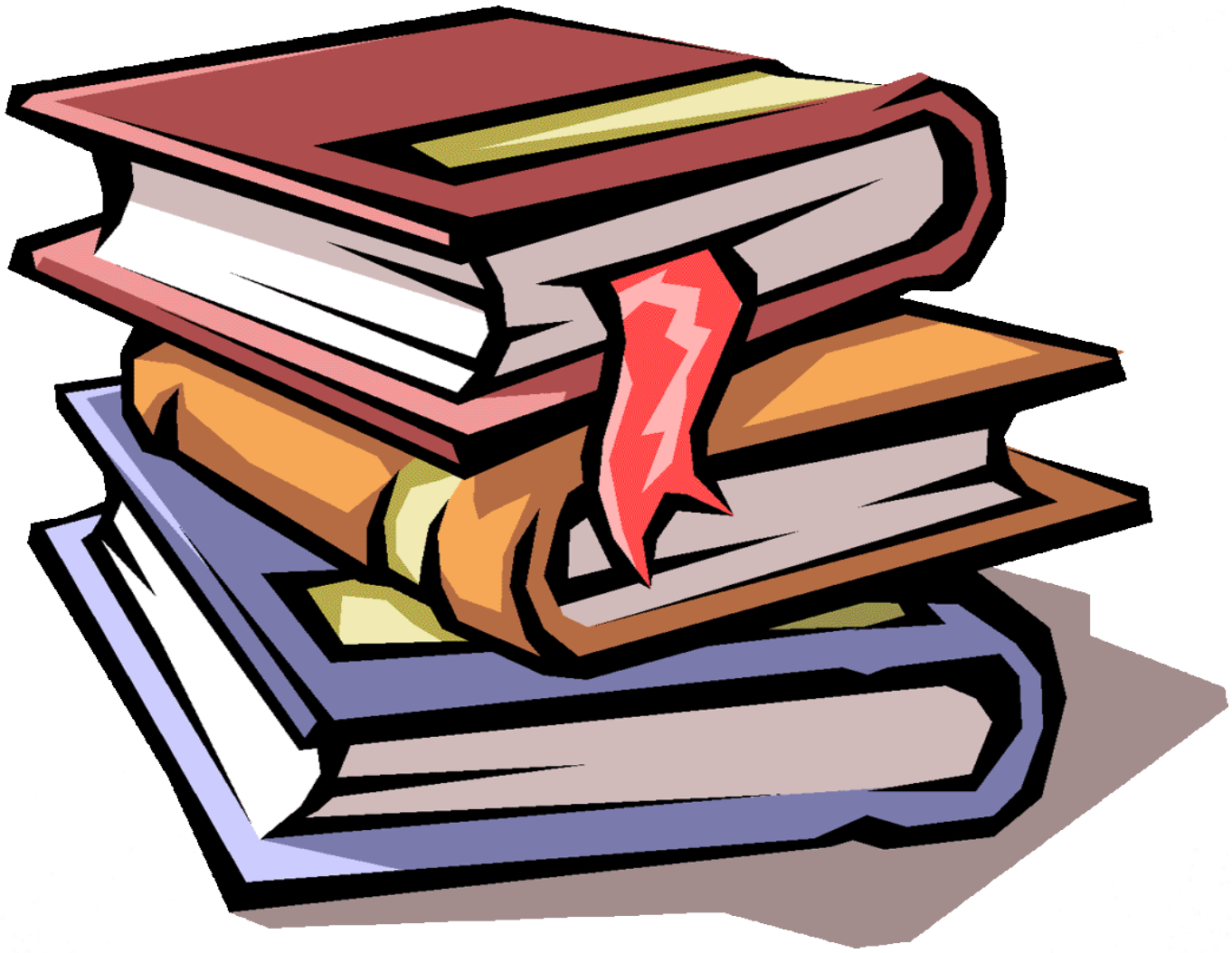
Having nurtured the department for so long how do you envision the future of your students and the department?

I want our department students to be trained as good biotechnologists. The degree does not really matter that is what I believe; just a degree does not make any sense. It is only important as long as you learn the skills and very importantly apply that knowledge. My vision for a biotech student is that he/she should be able to critically analyze every aspect of the subject. A stronger research is also part of my vision for the department.

Your students are at a junction where they have to make a career decision, what will be your advice for the students?

My advice to the students would be to let go of the rote learning model and to let go the want of just having a Biotech degree and strive to make the subject a part of you. One should live Biotechnology and for that one needs to show sincere, hard work. And while choosing a career, one does not have to choose hardcore biotechnology. My understanding of an education is the set of skills you learn. Today students have so many opportunities , the learning of how to learn and their ability to critically analyze aspects, should help them in whatever they do. Knowledge is changing so fast that today's knowledge could be redundant tomorrow ; but our students should not get bogged down by any situation. Also, they should make excellence a habit.

Article Directory



"Science is a way of thinking much more than it is a body of knowledge."

FROM THREE LIVES TO ONE...!

We all know that the mitochondria contain distinct genetic material, a mutation in which, can cause certain fatal diseases in an individual. Such mitochondrial defects are transferred from the mother to her child through the maternal mitochondria predominantly present in egg cytoplasm.

A novel technology has been devised to curb such a transfer by involving a third party in the fertilization process. In this Mitochondrial Replacement therapy, the healthy donor egg's nucleus is replaced with the nucleus isolated from the mother's defective egg. The resulting egg containing mother's nucleus and donor extra-nuclear genetic material is then fertilized in vitro with the father's sperm. The embryo is then implanted into the mother for further development. On 6th April, 2016, the world's first baby using this "Three Parent Embryo" technique was born to a Jordanian couple in Mexico aided by the New Hope Fertility Centre, New York. The mother carried a mitochondrial defect for the fatal Leigh syndrome. However, her baby boy showed no signs of the disease making his birth a hope for affected couples across the globe.

This method has been under critical scrutiny of medical, bioethical and psychological professionals since its advent. Advocates of the new procedure claim that since it does not alter any personal traits of the baby, the method is ethically sound when performed under appropriate regulations. Also trials in animals have suggested that mitochondrial donation is "not unsafe". However, experts have also warned that babies born using this technology might be at a greater risk of cancer and premature ageing, and would need to be monitored all their lives. Moreover the unforeseen epigenetic hazards and encouragement for development of "designer babies" have made seekers cynical towards the technology.

The only way of validating the method is by conducting human trials. After the birth of the Jordanian boy, approval process for such trials has been accelerated. Though the "3 parent baby" has fascinated many distressed couples globally, we should not neglect the fact that life has value, even before it has been born!

- Jueeli Lad

MSc II 2015-2017

Journey of an Organism to Space..

Surge in Biotechnology represents a revolutionary era in the history of science and technology. A myriad of realistic applications that seemed to be abstract thoughts of past, have been unleashed through Biotechnology. A renowned Astrophysicist, *Michio Kaku* has wisely said, "*By 2100, our destiny is to become like the gods we once worshiped and feared. But our tools will not be magic wands and potions but the science of computers, nanotechnology, artificial intelligence, biotechnology, and most of all, the quantum theory.*"

"*The process of scientific discovery is, in effect, a continual flight from wonder.*" Following this ideology of Sir Einstein, let us take a flight of biotechnology into Space. Terrestrial life has successfully crossed the protective barrier of atmosphere into outer space. Comprehension of biological mechanisms in terms of impacts of gravity and radiation field at the cellular and extracellular levels, Earth orbiting robotic spacecraft's like the Russian *Foton* satellites also space shuttles and space stations like *International Space Station* (ISS) and the *MIR* (220) have been used for carrying out the experiments.

Effect of gravity on gene expression was studied by carrying out DARE – DNA, Atmospheric Re-entry Experiment by Dr. Ullrich and Dr. Thiel at the University of Zurich. In this DNA was placed on the outer payload section of the shuttle and on its return from Space was checked for its function. Voila it was Functional! Scientists have noticed a need to inspect the foundational moral rule that ought to outline our aggregate space activities as we explore space. At Princeton University on June 8–10, 2010, a COSPAR Workshop on Ethical Considerations for Planetary Protection in Space Investigation was assembled where moral issues were considered. It first came to notice in 2006 with the problem of contamination of Mars. Conclusions of the same include encouraging public involvement and development of policies regarding planetary ethical principles.

Problems that seemed to be insurmountable are being now boldly faced by humankind through means of biotechnology tools like genetic engineering. An impetus towards space biotechnology has been given by the arena of the predicted market for biotechnological products. The questions that are being answered from such studies using biotechnology are; Up to what extent does the biosphere exist in the atmosphere? Can biological processes be used for the interplanetary translocation of microorganisms? How much Sterilization is observed on a spacecraft in an interplanetary space travel? The foremost question of mankind's interest is, 'Can the space environment be simulated for certain planetary conditions to test for the planet's habitability? Thus can life sustain outside Earth?

Quoting a few inspiring words by Astrophysicist *Michio Kaku* here, "*We are not at the end but at the beginning of a new physics. But whatever we find, there will always be new horizons continually awaiting us.*"

- Ketki Magar
Msc II 2015-2017

BATTLEFIELD CELL

Billions of viruses pass through our most vulnerable parts of the body. It is an enemy that has been studying our cells for eons. Its mission is to breach the cells defenses and make way towards the nucleus. Recognizing an old enemy, antibodies patrolling the area bind to the virus and prove easier prey for the massive roaming white blood cells but they are simply outnumbered. Thousands of viruses make it to the surface of the cell. Nothing should get through from here, unless the cell recognizes it as useful. Billions of years of conflict have given the viruses a copy of the highly specialized key. The virus army slips inside the cell. The original Trojan horse!

Every package delivered to the cells interior is imprisoned in sorting stations called endosomes. The endosomes, fitted with specialized protein pumps make the interior highly acidic eating away the virus' outer shell breaking it apart. This must spell disaster for the virus but in fact the invader counts on it as part of its escape plan. Viral disintegration releases a special protein tearing the endosome membrane apart that releases the virus. Virus with the right connector is grabbed by the motor proteins and hauled along the microtubules, the cells highways. The motor protein unwillingly aids the virus on its march toward the nucleus.

The virus releases its cargo into the command and control centre, the nucleus. Inside lie DNA machines that constantly tend to our bodies instruction manual. They unwittingly begin converting the deadly viral code into thousands of instructions and blueprints for a deadly army designed to spread infection. Unknown to the virus, a motor protein makes its way to the surface. It is carrying an important message, a warning to surrounding cells. This parcel carries a protein fragment of the virus, warning the body's immune system and a dying message that it is under attack. The nucleus once the centre for cellular organization now houses an army of 10,000 deadly clones, each ready to spread out and infect as many cells within our body as possible. The new army prepares to leave its dying host. The nucleus disintegrates letting loose the virus army.

The battle for this single cell is lost, but the war is far from over. While the virus was busy inside the cell, antibodies regrouped and now return in full force to take on the escaping army. The cell's warning to the outside world is not in vain, the heavy artillery arrives, the giant white blood cells devour the escaping virus, taking no chances they also engulf nearby cells vulnerable to infection. Some surrounding cells make the ultimate sacrifice and destroy themselves to restrict the spread of the virus. The body has won!

Our DNA connects us to a single prehistoric ancestor, a cell containing a single strand of DNA that started it all. The virus has also descended from that cell. This dark distant relative evolves alongside us. The eternal arms race is more than just a game of cat and mouse, it drives our evolution, and we have both grown stronger as a result.

-Akeeth Pinto
MSc II 2015-2017

THE WORLD OF EPIGENETICS

The fact that each cell of the body contains the same genetic material inherited i.e., DNA than why is it that a particular cell say an eye cell is differing from other cells like erythrocytes, hepatocytes, neurons, etc. although each cell harbors the same stretch of DNA? The answer for this question is "EPIGENETICS". Although the genetic material is same but it is epigenetic factors along with the genetic elements that allow differential expression pattern and provide the cell its unique identity.

The literal meaning of the term epigenetic is above genetic Corad Waddington defines epigenetic as 'a branch of biology which investigates the casual interaction between genes and their product which brings phenotype into being.' Epigenetic in current scenario is one of the major fields for research as epigenetic factors are noted to have far reaching effect on individual's health and behavioral pattern.

Epigenetics affect the transcriptional profile of the cell by altering the chromatin structure. Chromatin is a complex involving histone proteins around which DNA is bound and is thus responsible for the compaction of DNA. Changes in histone structure could be due to phosphorylation, methylation, acetylation, etc. alters the DNA wounding pattern making the DNA available or unavailable depending upon the histone modification for the process of transcription. To a tightly wound chromatin assembly enzymes needed in replication is not able to bind resulting in repression of the gene expression. DNA methylation is well elaborated mechanism of epigenetic control of expression, initiated by enzymes methyl transferases that aid in addition of methyl group to the cytosine of the CpG nucleotides that leads to transcriptional repression. Silencing of X chromosomes, the repetitive sequences in centromeric regions are examples that signify the role of methylation in gene silencing. Histone acetylases and histone deacetylases are enzymes that bring about acetylation of histones ultimately leading to repression or activation of certain genes due to chromatin remodeling. Besides the above processes RNA silencing mediated by non-coding RNA along with other components of cell chromatin and DNA methylation machinery to achieve silencing.

The role of epigenetic in cause of different diseases is under investigation. Epigenetic play a an important role in occurrence of cancer and research aiming to explore the role of epigenetic factors in disease development, prognosis and treatment of diseases like atherosclerosis, rheumatoid arthritis, asthma, Alzheimer's, dementia ,etc. is under investigation. Human Epigenome Project is an ongoing project which aims at finding the role of epigenome in development and modeling of above mentioned diseases as comparison of epigenetic modifications between normal and diseased subjects which will aid us in development of epigenetic therapy to combat the diseases for which no possible cure or prevention exists.

- Namrata Kanojia
MSc II 2015-2017

Food biotechnology– laboratory to society

'The kitchen's a laboratory, and everything that happens there has to do with science. It's biology, chemistry, physics. Yes, there's history. Yes, there's artistry. Yes, to all of that. But what happened there, what actually happens to the food is all science"

- Alton Brown

Biotechnology, which is seen being widely used in development of genetically modified food, is not new to man kind, as it is known to human minds ages before. we are looking forward to raise food crops by using tools of molecular biology and genetic alterations in order to develop crops/animals with enhanced pathogen resistance, increased yields and improved resistance to extreme environmental stress. These all attempts are carried out to address the food demands of society because in population of 11 billion about three countries are still starving and one fourth population has inadequate protein source. Although technologies are gusting with improved plant varieties for eradicating food crisis, there is prevalence of consequences and setbacks in the form of denunciation and criticism from various strata's of society

There are many such genetically modified crops generated in order to meet the needs, for e.g. rice varieties with increased pathogen resistance and flavonoid synthesis. Golden rice varieties are also developed in order to eradicate vitamin A deficiency. Similarly, genetically modified Salmon fish is developed for increased meat production. In addition to these mulching animals are also genetically modified to increase their milk production . All these genetically modified organism are widely studied and efforts are carried out for their commercialization, but the social, environmental and health hazards of these GMOs are preventing them from being harnessed. Many mishaps and hazardous effects of these GMOs in near history has made GMOs a matter of concern among common man. One such hazardous mishap was in 1999, a British scientist Dr. Arpad Pusztai developed transgenic potatoes spliced with DNA from Snowdrop plant and viral promoter from cauliflower mosaic virus (CMV), which was found to damage vital organs and immune system of lab rats. In this case the alarming consequence was the use of CMV promoter in most of the GMOs which can thereby cause similar outcomes in respective GM food crop. More over due to development of herbicide resistant strains of crops, farmers spray large amount of herbicide in their farms to kill weeds, thereby polluting the air and soil. Companies like Monsanto, Dupont, AgrEvo, and Novartis take advantage of such technology and produce such plant varieties in order to increase their sale of chemical herbicides, which in turn is a great loss of environment.. Such companies not only add in environmental damage but are also indulged in creating social disparity by patenting GM varieties and earning large royalties from farmers who aspires to buy such varieties. Such social disparity is intensed by introduction of termination technology which adds up in the burden of investments of farmers in buying seeds of GM crops every plantation.

Genetically modified plants and animals, with respect to fulfill the food demands across the world, are threat more than a boon to society. Genetic modifications in cases of medicine and therapeutics for dreadful and incurable diseases are valid applications of biotechnology, there will be a threat underlying the incredible potentials of these GMOs. At the end, man will again find himself in vicious circle to develop more genetically modified organisms as solutions to disorders developed due to over use of genetically engineered food and medicine. Disruption of the blue print of life will definitely cost on mankind in near future with some uncontrollable and irreversible changes in nature.

- Ketaki Bachal
MSc II 2015-2017

All views expressed by the authors are either compilations of referred articles or personal.

INSPIRING BIOENTREPRENEURS

"Dream and everything in the universe will conspire to fulfill it"- a famous line by The Alchemist Paulo Coelho is of great importance to a bioentrepreneur. The field of Bioentrepreneurship is a blooming field that is gaining more and more support from day to day. The growth of the biotech industry will see an increase in the bioentrepreneurs in India. The willingness to change ones perspectives when challenged with new ideas and the ability to adapt to changes are the most important qualities of a successful entrepreneur. Is has been estimated that the biotechnology sector is likely to reach $ 100 billion by 2025 as the biotech industries develop in the country. The upcoming entrepreneurs must understand the market potential and come up with new solutions and products that can help consumers. The important and essential key elements of the biotech industry are collaboration and effective sharing of knowledge which every bioentrepreneur should use wisely.

India is amongst the world's top 12 biotech powers. The major share of the biotech industries is engaged in manufacturing of health care products and the immediate need of the hour is to develop safe products that can save millions of lives. The best example of a successful entrepreneur in the health care industry is that of Mr. Dilip Shanghvi the proud owner of the Sun pharmaceuticals industry. Mr Dilip was born in a small town of Amreli in Gujarat. It is quite fascinating to know that Mr. Dilip began his pharmaceutical company with just 5 products and 5 people who has now achieved revenue of 22.37 billion. His well planned strategies and talent to turn around companies in distress helped him succeed in his career.

The biotechnology and pharmaceutical industry has been gaining momentum over the past years and this sector needs young minds familiar with industrial needs. To be a successful bioentrepreneur in the field of biotech every entrepreneur must understand the grassroots of the biotechnology sector and come up with business plans to achieve success. A successful bioentrepreneur must be persuasive and creative. They must be able to develop excellent social and communication skills. Bioentrepreneurs must not only have the scientific idea but also the ability to convince others to invest in their ideas. The road from concept to conquest can have many road blocks; it's the ability of entrepreneurs to device solutions and come up with strategies that help them become successful entrepreneurs. It is ones belief in concept that ultimately becomes the driving force in the road to success.

- Percival D'Gama
MSc II 2015-2017

SNAKES AND HUMANS

This article is about creating awareness among the people and basically resolving the myths and misconceptions that people have about snakes.

MISCONCEPTIONS

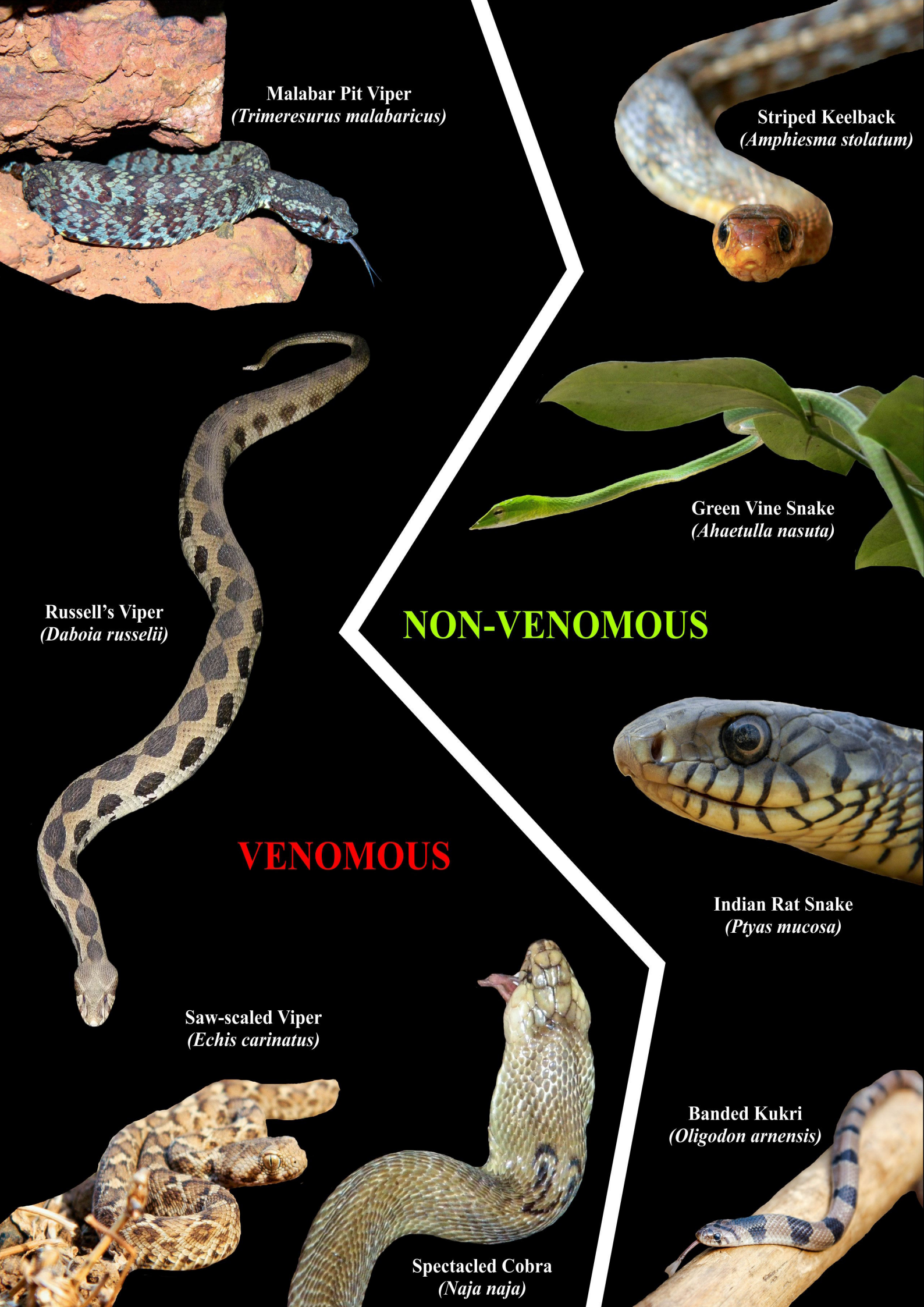
- The most prevalent misconception is that all snakes are poisonous and they are always looking for an opportunity to bite humans.
- Some snakes are worshipping forces but some are considered to be an omen in India.
- Since they are worshipped, people also think that they go away if shown a gesture of respect, like bowing, or joining hands.
- Some people also feel that snakes should be killed instantly when spotted.
- They tend to follow humans if harassed.
- Snakes are also said to drink milk and dance to music.
- It is also believed that once bitten a person becomes immune to snake bites.

These were only some of the many misconceptions that I know and have heard from people. None of them hold true.

Snakes are indeed dangerous and their venom can be lethal. But the most important fact is that snakes like any other animal are scared of humans and try to avoid human encounters as far as possible. Snakes never consider humans to be their prey. But if harassed, they can strike in defence. Sometimes they even deliver false bites where they do not release their venom. That is when people feel that they are not affected or immune to snake bites. Since it is the only defence that they have and it takes time to reproduce it, they use it judiciously. Though evolution has incredibly increased their sense of smelling, snakes cannot hear so dancing is out of the debate. Some of these snakes have brilliant camouflaging abilities. Treading on them by mistake is the most common way of getting bitten by snakes. Sometimes snakes tend to enter human settlements in search of prey or for shelter. This is when the human-snake conflict begins. Unaware of the fact whether they are venomous or not, most of the times these poor creatures are killed. Though they are potentially harmful this can be avoided. Very few people help to rescue them by calling snake rescuers. Snakes can be venomous or non-venomous. Most of the snakes found in India are active at night (nocturnal). The reason for this is that they are cold blooded and their prey, on which they feed, are mostly nocturnal. The species of snakes found in India that are venomous are Cobra, Krait, Russell's viper, Saw-scaled viper and other Pit vipers such as Bamboo pit viper, Malabar pit viper.

The facts mentioned in this article are from personal experiences. Though identification of whether the snake is venomous or not is difficult, one can at least try their best to avoid complications either by moving away or calling for rescue and saving them as snakes are indeed beautiful creatures.

-Amogh Mhatre
MSc-II 2015-2017


Malabar Pit Viper
(Trimeresurus malabaricus)
Striped Keelback
(Amphiesma stolatum)
Green Vine Snake
(Ahaetulla nasuta)
Russell's Viper
(Daboia russelii)
NON-VENOMOUS
Indian Rat Snake
(Ptyas mucosa)
VENOMOUS
Saw-scaled Viper
(Echis carinatus)
Spectacled Cobra
(Naja naja)
Banded Kukri
(Oligodon arnensis)

Career Calling

"No one can build you the bridge on which you, and only you must cross the river of life. Where does it lead?

Don't Ask! Just walk!"

- Friedrich Nietzsche

Choosing a career can become too overwhelming; so we have put together a few testimonials from former students of the department. Enjoy!

ALUMNI CORNER

As everyone knows that St.Xavier's College (Mumbai) is one of the most prestigious colleges in India. I feel really proud to say that I was a part of this college. I studied MSc Biotechnology (2012-2014) here and i can proudly say that these were the best days of my life. The entire campus in Xavier's is outstanding (architectural structure more like Hogwarts, huge library, canteen, various events etc.). Now describing about my own department of biotechnology makes me nostalgic. Our batch was the first one to be in the new semester pattern and we often referred to ourselves as "guinea pigs". Initially we had a very rough time adjusting with the new system, syllabus, timings etc but with the help of our professors we managed it nicely. The entire department has very good faculty. They not only encourage you to do well in academics but also tell you to improve on personal level.

And it's not always about academics here; we have our annual fest "Palindrome". It's a great platform to showcase your skills, socialize with people around, come up with new idea, and bring creativity to life. Trust me all this will help you all later somewhere or the other.

Currently I am working in Reliance Life Sciences as Quality Assurance. Those of you who are not really interested in PhD or research related work can obviously try for QA /QC jobs. There are many opportunities. It's not a very hectic job (depends on you) and you get practical knowledge about how an Pharma company works.

Finally I would like to say that if you have got an opportunity to be in Xavier's don't miss it and utilize it to the maximum. It will help you to develop your skills at professional as well as personal level. Learn as much as you can from here, keep your basics right, try to develop your skills, think out of the box, participate in events, exhibitions, socialize with people, this is all what is going to help you in the outside world and to succeed in life.

"All the best"

- Varsha Bhodke '14

ALUMNI CORNER

I belonged to the first autonomous batch of PGDBT- St Xavier's College (2012-2014). We as biotechnology graduates and post-graduates often hear the ever daunting question- "What next"? from everyone including our friends to aunties living next door! Let's face it, at some point or the other, it does manage to make us doubt our decision of pursuing it. When this happens, just dust the doubt off by reminding yourself that you're a Xavierite! Trust me, it works.

I completed my masters on 30th April 2014 and on 28th May 2014, I joined Cognizant Technology Solutions as a Clinical Data Analyst. I was lucky enough to be employed within less than a month of writing my final exams. Being an autonomous institution, our curriculum is tweaked to refinement. In the first semester, we had a unique module on Clinical Research, that made me crack the interview and get the job. As we all know that, our life as master's student in St. Xavier's is different from our fellow friends from other colleges. From peer learning to analytical thinking, we are taught and assessed continuously. The word we use for such assessments is 'pressure'. But as we move into the corporate world we call it a 'blessing'. Such education system, makes us so able and agile that we can thrive on any given deadlines. We are imbibed with the ability to produce quality and quantity within stringent timelines. This was my personal experience, when in Cognizant.

I worked there for over 2 years and developed keen interest in clinical research. Consequently, in 2016 I moved to Ireland to pursue master's in clinical research. I am grateful to my professors at St. Xavier's College. They guided me in every step of my journey from India to Ireland. I currently am a fellowship student at the National University of Ireland- Galway. To my surprise, the Irish education system is quite similar to our system at St. Xavier's College. Right from teaching to assessing and not to forget the emphasis on plagiarism! I got adjusted into the system here quite easily because I had that exposure at St. Xavier's. I am working here in the HRB Clinical Research facility along with studying and also am an NUI Galway International Student Ambassador for India 2016-2017.

The exposure we get as students in PGDBT of St. Xavier's College is second to none. We learn skills that we would realize and value years down the line. Lastly, I would say take as much as you can from these two years. I reckon it would open several doors for the research lover in you and the research hater in you as well.

Krupa Vyas '14

ALUMNI CORNER

Curiosity, Inquisitiveness and Persistence are the main fuels that drive Science (apart from strong funding of course!). Any research project starts with a question which needs answers…… a thought or a scientific guess (hypothesis) that needs to be verified. I am pursuing my PhD on a research topic relating to cell migration in hematopoietic cells. I work in a Structural Biology lab where we try to understand protein functions and protein-protein interactions by elucidating the three dimensional atomic structure of proteins employing X-ray crystallography. We also employ numerous molecular biology, cell biology and chromatography techniques in our studies for cloning, protein purification and in vivo studies.

I am chasing my research problem for a little over two years now…..in fact a small part of it was assigned to me when I had joined the lab for my Masters dissertation. My project is challenging and I have faced many hurdles but I enjoy my work and find it exciting. A lot of brainstorming and background reading is what helps shape the path of the project. Thought everything is not always green and there are at least a hundred failures (I'm not joking) before the eureka moment. The biggest lesson I can share is that you have to be really very patient and persistent at each step. There should be no thought of quitting at any cost whatever number of attempts one has made and all that is left to do is to come up with one more alternate strategy which might work. Failure is a part of research and even failed results are results and may give you some insights to your projects.

I think it is simply the nature of science to not reveal its secrets very easily…..so all that we can do is keep trying alternatives till we succeed in breaking the shell. Eureka moments in Science are rare (rarer in Biology) but are surely worth the struggle. My PhD supervisor always encourages us with "Remember…..no one on Earth in the last billion years has learnt the secret to your protein and if you are successful, you'll be the first person to see its structure and know its function…..isn't that wonderful?? So keep trying". We'll it hasn't yet been my time for the Eureka….but I'm eagerly hoping for one soon!

-Zenia Motiwala '14

ALUMNI CORNER

I feel lucky to be somewhere I always wanted to be and doing something I always wanted to do. After graduating from St. Xavier's, my skills and knowledge helped me fit flawlessly in my current position. Presently, I am pursuing PhD in Biomedical Sciences – Cellular & Molecular Biology at Kent State University, Ohio, USA. I have been able to deploy the dexterity I built over those two years of pursuing my Masters in Biotechnology from St. Xavier's College, Autonomous, Mumbai.

The results of doing M. Sc. in Biotechnology are real and lasting. St. Xavier's provided an exceedingly captivating academic experience, a milieu so competitive yet healthy, that it helped me expand my perspectives of learning and research. These two years at the PG Department of Biotechnology, St. Xavier's College provided me with interdisciplinary prospects which gave me a direction and made me comprehend what my interests really lie in. The academic experience and the proficiency of all the professors in different subjects provided a complete package of excellence and all we could do is learn, learn and learn more each day. It is Xavier's that made me realize that I was strong enough to outshine any hurdle and still achieve what I want. Analytical thinking, logical reasoning and scientific communication are some of my attributes that I honed during my Masters and these helped me do extremely well in GRE and TOEFL. For me, St. Xavier's is the place where my dream of studying in the USA took off!

Here, in the USA, rote learning is highly discouraged. They believe in executing knowledge that you have acquired in due course of time. Unlike other Indians, I was prepared for this, thanks to the education system I was exposed to at St. Xavier's. There are several aspects to this Department of Biotechnology that I didn't realize while I was in there but have since found them to be incredible resources that shaped me. The best thing about being a part of this institute is that it helps you grow academically and professionally. The encouragement and motivation you get from each professor, with the biggest support being Dr. (Ms.) Vivien Amonkar, helped me sail through and is the reason why I am able to excel today in my career. It made an impact on my career even before I graduated. For me, it laid down the foundation of research and technological entrepreneurship. I think it is helping me evolve with the biotech industry and as we know Biotechnology is the future and I feel studying at Xavier's prepared me for it.

In the true sense, PG Department of Biotechnology, St. Xavier's College has been a major stepping stone in my path of success.

-Manasi Agarwal '15

Career Calling....

Higher studies: Pursuing a doctorate after post-graduation allows a student to gain in-depth knowledge and competence in their specific research area as well as a breadth of knowledge in biology, bioengineering and biotechnology.

Academia: One can opt for the position of a lecturer if they possess an aptitude for the profession. For the post of lecturer in a college, one needs to clear NET-LS (National Eligibility Test - Lectureship) only then can you apply for the post. CSIR conducts an entrance test biannually and students can remain updated through their official website.

Intellectual Property Research and Patenting: A student with interest in law can avail to courses offered at government or private institutes. IIT-Kharagpur, Rajiv Gandhi School of Intellectual Property Law, offers 3 year LLB program with specialization in IPR. PG diploma, Post Graduate Certificate, Diploma, Certificate Courses, Distance Learning as well as Online Courses are offered in IPR. NLSIU, NALSAR, Amity Law School, IGNOU etc offer diploma programs through distance education.

Entrepreneurship: Biotechnology professionals who want a career beyond the laboratory within an existing biotechnology organization or for those who dream of starting a new biotechnology enterprise can sign up for various training courses to learn entrepreneurial skills.

Quality control analysts/ R&D: Coping with the fierce competition to ensure the best quality services, pharmaceutical and biotech industries are investing more into their R&D wing. This trend in the recent years have ensured more aspirants getting placed in the R&D and QAQC departments.

Sales and management executives: Students will learn about the regulatory role of state and federal government agencies, international bodies and professional groups. Aspirants of MBA need to qualify in management entrance examinations (eg. CAT/ GMAT/ MAT) for admission in a prestigious institute.

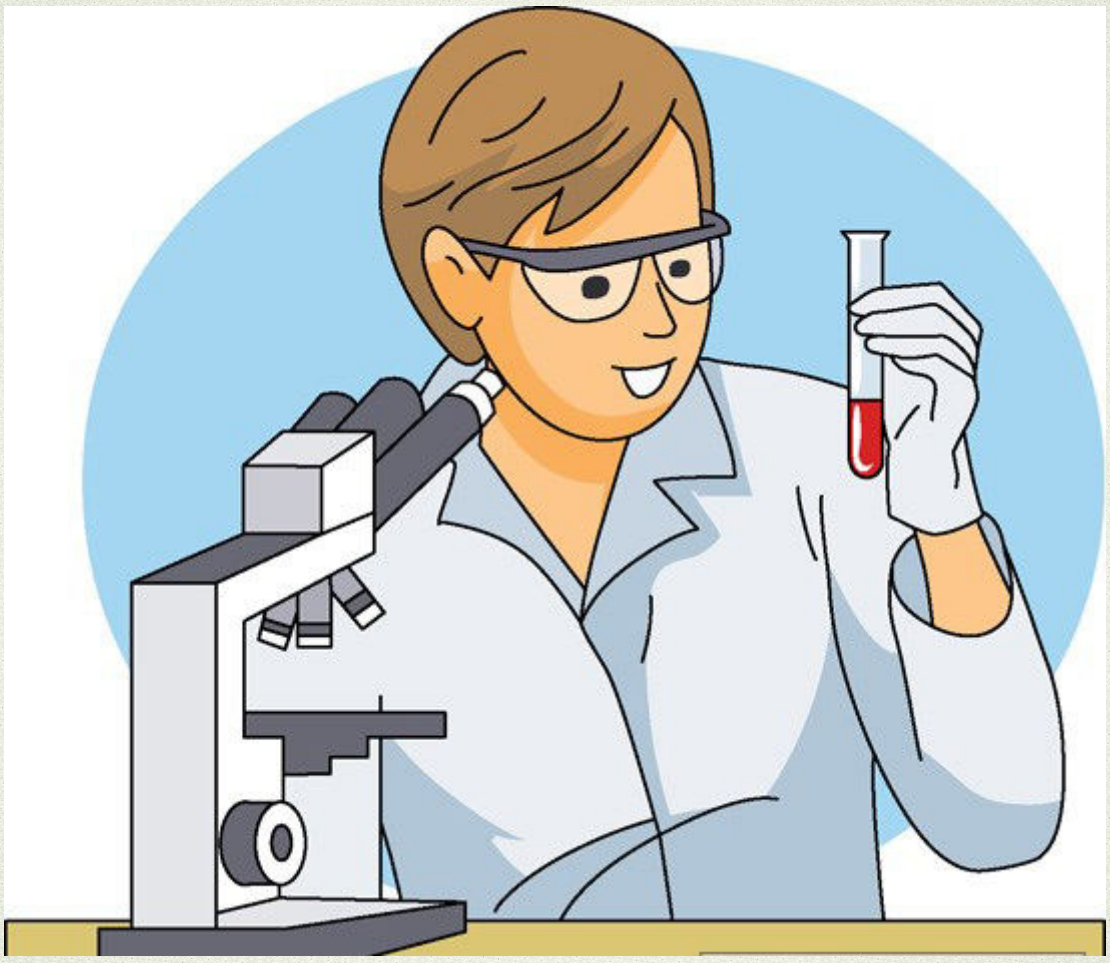
Scientific Publishing: A number of organisations, such as Cactus Communications and Crimson Interactive recruit graduates for the Scientific content writing and editing. You need to be an excellent communicator and team worker; comfortable with making decisions, organised and able to work under pressure. Other essential qualities include excellent English and a keen eye for detail.

Clinical Research: Clinical Research Associates are responsible for conducting clinical trials. This job involves monitoring study sites, performing routine data collection from patients, verifying data sources, and reviewing regulatory documents/files to ensure that documents are in compliance with protocols, regulatory requirements, SOPs (standard operating procedures), and are aligned with the Monitoring Plan.

Medical coding/transcription: Medical Transcriptionists and coders are specialists in medical language and healthcare documentation. Transcriptionists and Coders are employed primarily by private medical transcription companies. One can choose to work full-time, part-time, or in a flexible work schedule in different medical transcription companies.

Joel John
MSc II 2015-2017

Young Scientists at work



"Equipped with his five senses, man explores the universe around him and calls the adventure science"

-Edwin Powell Hubble

Lareina Richard George (PI: Dr. Rajani Kant Chittela)

"Overexpression, Purification and Characterization of Truncated Translin mutant (T-215) from Rice (Oryza sativa)"

Translin is ~ 27 kDa protein that distinguishes consensus sequences occurring at the breakpoint interchanges in chromosomal translocations. The study involves cDNA from *O. sativa* being replicated into an expression vector for characterization of plant (rice) translin. The study is designed to overexpress truncated translin in host *E. coli* BL21 (DE3) and its purification by affinity chromatography. Purified truncated translin protein is checked for octameric ring formation and its biological activities like DNA binding. Circular dichroism (CD) and Dynamic light scattering (DLS) analysis led to the determination that the biological characterization of truncated translin is affected and binding activity is altered involving its octameric conformation. Considering translin biology from plant organization will contribute to its efficient role throughout plant development.

Loran Francis. Pereira (PI: Dr. D.P. Fulzele)

"Cloning of Strictosidine synthase gene from Nothapodytes foetida in pHANNIBAL vector for RNAi work"

Interference RNA (RNAi) is a valuable technique, out of which hairpin construct having sense and antisense on either side of intron is most efficient in gene silencing. In this work, vector pHANNIBAL was successfully cloned with sense and antisense sequence for STR gene which plays an important role in biosynthesis of an important anticancer agent, Camptothecin (CTP). RNAi is one such technique which can be used to map the function of STR gene within the plant, therefore this construct can be further cloned into binary vector followed by *Agrobacterium* mediated transformation and can be used to transform plant resulting in formation of hairpin construct in plant and inhibition of STR mRNA.

Joshabel Christiana Stira (PI:Dr.Deepak Sharma)

"Immunomodulatory effects of *Punica granatum* peel extract and Chlorogenic acid ***on mice splenic lymphocytes"***

The effect of *P.granatum* a natural fruit peel extract and Chlorogenic acid, a polyphenol extracted from coffee beans, on immune modulation in mice splenic lymphocytes was examined *in vitro.* Flow cytometric analysis indicated that *P.granatum* enhanced the proliferation in Con A stimulated splenic lymphocytes. Substantial decrease in the basal levels of intracellular ROS post radiation (4Gy) in dose dependent manner in vitro was also observed. Induction in the NFκB nuclear translocation was determined by EMSA. Decrease in the intracellular ROS after exposed to radiation (4Gy) in a dose dependent manner was detected. EMSA results reveal that Chlorogenic acid induced the nuclear translocation of Nrf-2. Therefore, these natural compounds can be used in conjunction with available natural immunostimulating drugs to enhance their activity and can act as antioxidant agents *in vitro.*

Hemani Suvarna(PI: Dr .S. Jayakumar)

"Study on the role of mir-28-5p and mir-200 microRNAs in radiosensitivity of lung cancer cells."

Radiotherapy is the most important therapy for cancer treatment and the main strategy for treating Non Small Cell Lung Cancer (NSCLC). Evidences suggest a link between collection of miRNAs and radioresistance and those miRNAs function as either radiosensitizers or radioprotectors through various mechanisms. Their intrinsic role in cancer demonstrates their potential as a viable therapeutic strategy and a powerful intervention tool. Expression of ten miRNAs was analyzed using Real PCR (RT-PCR). Micronas mir 28-5p and mir-200 upregulated in RT PCR were selected for radiosensitivity studies using miRNA inhibitors. Clonogenic assay was used to assess the radiosensitivity and the extent of DNA damage was measured by Gamma H2AX assay. Redox status of cells after inhibiting mir-28-5p and mir-200 was estimated using DCFDA probes. A549 cells transfected with mir-28-5p and mi-200 differed significantly in their radiosensitivity as observed in clonogenic and gamma-H2AX assays. The ROS levels for scramble and mir-200 was higher after irradiation (4Gy) but decreased in mir-28-5pi.

Namrata Kamble (PI: Dr. Shashidhar R.)

"Development of microbiologically safe health drinks for immunocompromised patients"

Attempt to develop novel health drink for special group of people using several fruit juice formulation like mung Mung, orange; and apple, banana, and carrot juices was carried out. The accepted range by taste panellists and their microbial load was found to be 6.4 and 4.8 log CFU/ml, respectively. Gamma irradiation and pasteurization were used to reduce the microbial load were the two approaches followed. Irradiation was successful in reducing the microbial count of the juice. Dosage of 2.0 kGy gamma radiation gave least count, however an undesirable flavour to both the juice was seen. Therefore, pasteurization at 80°C for 30secs and 1min was carried out which resulted in microbiologically safe juice. In both the conditions, no load for both the juices, even after 10 days was observed. The storage capacity of the juice was found to be 10 days. Addition of 0.2% ascorbic acid in apple, banana, and carrot juice prevented browning till 15 days, while pasteurized juice did not show browning till 21 days.

Dency Vincent Almeida (PI: Dr. Deepak Sharma)

"Immunomodulatory effects of Dalbergia sissoo and chlorogenic acid on murine splenic lymphocytes"

The ethanolic extract of herbal plant *Dalbergia sissoo* and the phytochemical chlorogenic acid extracted from raw coffee beans, possess antioxidant properties. The present study describes the in vitro immunomodulatory effects of ethanolic extract of *Dalbergia sissoo* and chlorogenic acid on murine splenic lymphocytes. Ethanolic extract of *D. sissoo* has shown to significantly enhance T cell proliferation induced by Concanavalin A in vitro.Further increase in Concanavalin A induced T cell proliferation was also accompanied by increase in the levels of Con A induced secretion of IL-2 and IFN-γ cytokines. Ethanolic extract of *D. sissoo* also exhibited its antioxidant property by decreasing basal as well as radiation induced increase in reactive oxygen species (ROS) levels. To characterize the mechanism of action of ethanolic extract of *D. sissoo*, its effect on Con A induced NFκB was studied using electrophoretic mobility shift assay. Also studies pertaining to the immunomodulatory activity of chlorogenic acid were carried out. It was observed that CA enhanced the levels of LPS induced IL-1 and IL-6 cytokines and also exhibited antioxidant property by decreasing radiation induced ROS levels in a dose dependent manner. The effect of CA on redox sensitive anti-inflammatory transcription factor Nrf-2 was examined and the result revealed that it induced nuclear translocation of transcription factor Nrf-2 .

Nida Baghban (PI: Dr. Narayan Rao)

"Study of Breast cancer gene mutations"

Breast cancer displays an autosomal dominant inheritance pattern wherein a mutation in only one copy of the gene is sufficient to predispose an individual to a high risk of acquiring the disease. BRCA1 and BRCA2 are responsible for maintaining genomic stability and restricting uncontrolled cell growth. Several unique mutations, majority of which are nonsense mutations, deletions or insertions, have been identified in the BRCA1 gene. The presence of such high number of mutations in the BRCA1 gene makes the process of genetic screening highly complex. The susceptibility of individuals to cancer can be identified by the identification of specific "markers" that are associated with the gene. The following study aims to develop a microarray for the simultaneous detection of the several reported mutations in the BRCA1 gene specifically in the Indian population. Using this technology, the different reported mutations in the BRCA1 gene and the classification of cancer on the basis of the patterns of gene activity in the tumor cells will be made possible providing a potential breakthrough in designing of treatment strategies to directly target hereditary breast cancer in the most cost-effective manner.

Ria Darne (Pi: Dr. Savita Kulkarni, Mr. Pramod Kumar Gupta)

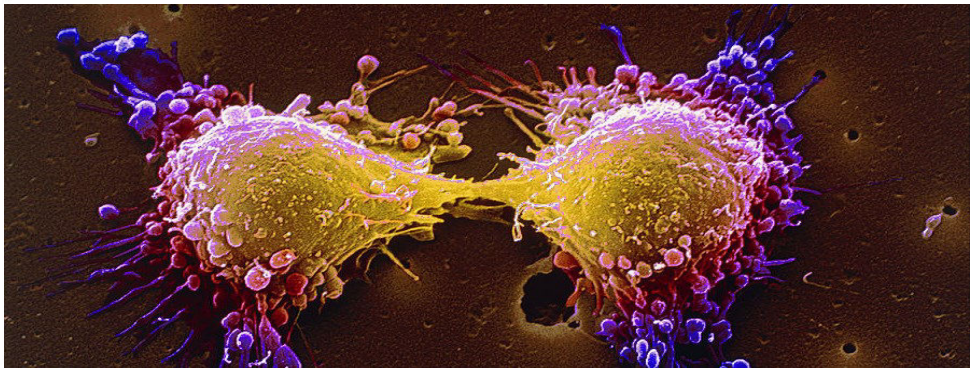
"Effect of Curcumin on Autophagy, Apoptosis and Phagosome-Lysosome fusion in Mycobacterium tuberculosisinfected Murine Macrophage cell line RAW 264.7"

Curcumin (CMN), the primary constituent of turmeric exhibits antimycobacterial activity in murine macrophage cell line RAW 264.7 infected with multi-drug resistant (MDR) strains of MTB. The western blot data demonstrated that CMN induced autophagy in RAW 264.7 infected with MTB H37Rv and was represented by the conversion of LC3I to LC3II and reduction of p62 expression after 24 hours. The flow cytometric profiles of propidium iodide-stained RAW 264.7 cells after 48 hours showed apoptosis in a dose-dependent fashion. Confocal microscopic images of macrophages stained with LysoTracker Red dye and infected with green fluorescent protein (GFP)-tagged MTB H37Rv treated with CMN exhibited co-localization of GFP-H37Rv containing phagosomes and LysoTracker. Red stained lysosomes which was evident from the resulting yellow fluorescence. Collectively the data demonstrates that CMN induces autophagy, apoptosis and phagosome-lysosome fusion in RAW 264.7 infected with MTB H37Rv. The detailed molecular mechanisms underlying these effects are exciting areas for future work .

Debaipsa Bhattacharya (PI: Dr. Birija Sankar Patro)

"Mechanistic Role of Wrn-Chk1 Pathway in Activating Nf-κb Mediated Chemo-Resistance In Response To Camptothecin Treatment"

Camptothecin (CPT) is the compound that specifically targets topoisomerase I, by binding to the Top1–DNA complex in a manner that prevents the re-ligation of nicked DNA and generates single strand break. This study reports that WRN, member of RecQ helicase family, is playing a critical role in activation of NF-kB pathway, which leads to resistance against CPT. In addition to this, verification of CHK1 kinase in phosphorylating the TOP1 bound to CPT and DNA, which may result into degradation of Topoisomerase I and activation of NF-kB. Hence, the understanding of the novel role of WRN-CHK1 pathway will be beneficial for developing different therapeutic strategies against WRN over-expressing and WRN deficient cancers.



Oindrila De (PI: Dr. Sorab N. Dalal)

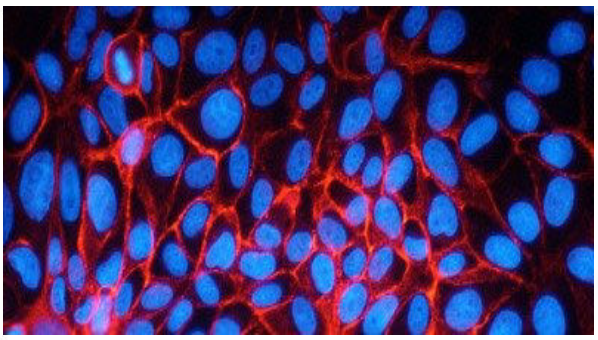
"Identifying the mechanisms regulating LCN2 expression upon PKP3 loss"

Desmosomes are intercellular junctions which anchor the intermediate filaments at the membrane associated plaques. The desmosomal protein plakophilin3 (PKP3) loss leads to a decrease in desmosome size and cell-cell adhesion and also leads to activation of p38β MAPK. PKP3 and p38β form a complex in cells. The substrates and activators of p38β have a common docking site called the 'D domain' which is essential for binding to p38β. The two main objectives of this study were to identify the binding domains of p38β MAPK involved in the interaction between p38β and PKP3 and to understand how p38β MAPK regulates LCN2 expression upon PKP3 loss. Attempts have been made to generate CD and ED domain deletion mutants of p38β. Moreover, restoration of PKP3 expression in the PKP3 knockdown clones causes a decrease in ELK1 phosphorylation and expression levels demonstrating that the increase in phosphorylation and expression of ELK1 is a direct effect of PKP3 knockdown. To understand the role of C/EBPβ in regulating LCN2 expression upon PKP3 loss, C/EBPβ knockdown clones were generated from an HCT116 derived PKP3 knockdown clone.

P. Vineeth. Daniel (PI: Dr. Prasanna Venkatraman)

"Exploring PSMD9-PDZ Interactions with C-terminal residues of CDC42 and Snail1 proteins as a Novel Mechanism modulating Cytoskeletal architecture and Cellular migration."

Protein interactions help in cell to cell communication encompassing numerous hub proteins which when engaged in abnormal signalling trigger anomalous activities within the cellular micro-environment. Metastasis is one such phenomenon directs the cell to undergo cytoskeletal remodeling which would further facilitate migration. Investigation of the interaction of PSMD9 a proteasomal chaperone with two significant marker proteins involved in cytoskeletal rearrangement and cellular migration through its PDZ domain namely Cdc42 and Snail1. Cloning of Cdc42 and Snail1 ORF's into a mammalian expression vector using sticky end ligation was carried out and transfected into Hela cells to assess their expression and interaction with endogenous PSMD9 in co-immunoprecipitation experiments. Western blot studies revealed the robust expression of fusion proteins in Hela cervical carcinoma cell lines. Interaction between endogenous PSMD9 and 3XFlag-Cdc42 in Hela cell lysate was seen but not with Snail1 protein. Overall dissecting Cdc42 or Snail1 protein interactions PSMD9 will explore the extent of PSMD9-cytoskeletal crosstalk and its influence on migratory behaviour and morphology which can have potential implications in tumour metastasis.



Sejalben Arvindbhai Patel (PI:Dr. Pritha Ray)

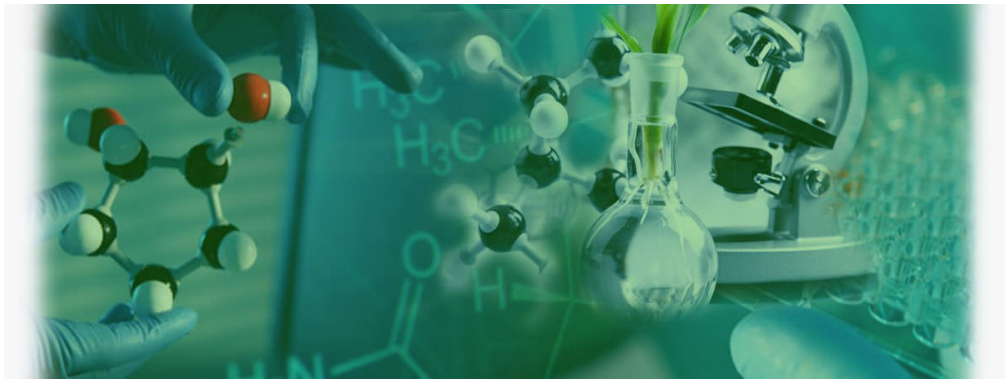
" Study of stress induced kinases in chemo-resistant ovarian cancer cells "

Eukaryotic cells have evolved surveillance machinery for activating appropriate pathways in response to DNA damage. p53, a tumor suppressor gene regulates events such as cell cycle arrest, DNA repair and apoptosis in response to DNA assaults caused by exogenous and endogenous agents. Perturbation of the activity of p53 due to mutations has been implicated in many human cancers and therefore has attracted the attention of researchers. Regulation of cell cycle events by p53 requires its stabilization in cells by means of various post translational modifications such as phosphorylation and acetylation. Phosphorylation of p53 requires prior activation of regulatory kinases ATM, ATR, CHK1 and CHK2. It has been previously found that the serine 15 and serine 20 phosphorylation are found to minimal in the chemo resistant A2780 cells. This project aims at studying the levels of these activated kinases in response to drug treatment (cisplatin, paclitaxel and combinatorial) in chemo sensitive and chemo resistant A2780 ovarian carcinoma cells. Levels of caspase 3 proteins activated in apoptotic pathway after cisplatin in chemo sensitive and chemo resistant A2780 ovarian carcinoma cells were also checked. The levels of activated kinases after drug treatment were found to be declining in chemo resistant A2780 cells as compared to sensitive A2780 cells. Also, caspase 3 was found to be down regulated in chemo resistant A2780 cells, suggesting that apoptotic machinery is not activated. This preliminary data suggests that the down regulation of the kinases might be a possible reason for the survival of the chemo resistant A2780 cells.

Kimberly Ann D'Souza (PI: Dr N. Ramaiah)

"Xylanases, cellulases and phylogenetic relatedness of marine bacteria and their biobleaching potential"

The isolation of xylan and cellulose degrading bacteria was carried out from the mangrove ecosystem of Goa-India thereby assessing their enzyme production ability as well as their ability to decolourize paper pulp. The isolated Bacteria were grown on CMC agar and xylan agar. Based on their specific enzyme activities 3 of the best xylanase and cellulase producing cultures were selected and maximal enzyme production was observed at their early stationary phase with an optimal growth temperature of 37°C and pH was optimized. Most cultures showed highest enzyme activity at 37°C whereas a xylanase from one isolate showed optimal at 55ºC. Xylanase activity was optimal between a pH range of 6 to 8 where as one culture showed high activity at pH between 3 to 10 with highest at pH 7 and the cellulase activity was optimal at pH 3 and 5 with highest at 5. The xylanase produced had high activity however the same cannot be said about cellulase. The isolates were identified as belonging to *Bacillus sp.* and when the xylanase and cellulase producing strains were used in combination to verify their decolourization ability. The results indicated their potential use in biobleaching.



Matilda D'souza(Pi: Dr. Rinti Banerjee)

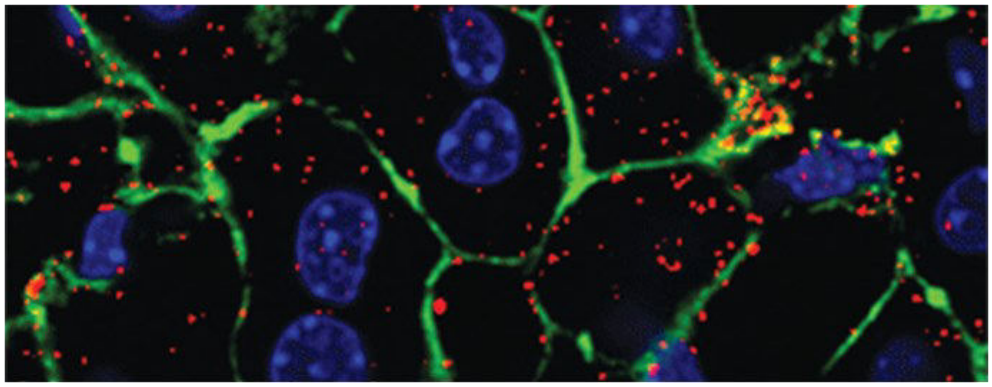
"Non-Invasive Dermal Filler"

Skin aging can be caused due to internal and external factors. Hyaluronic acid (HA) is a part of the extracellular matrix of the skin & is made up of repeating units of N-acetyl-D-glucosamine and D-glucuronic acid. Degradation of HA can be caused due to enzymatic and non enzymatic processes. To retain the youthful appearance of the skin, HA is used as dermal filler. Its water retaining capacity, biocompatibility and non-immunogenicity makes it a preferred choice. HA is administered by injecting it into the skin. In an effort to make this process more patient friendly, attempts have been made to deliver HA to the dermis transepidermally. Topical application of the emulsion avoids unnecessary side effects. An emulsion was prepared consisting of corn oil, different concentrations of HA solution and non-ionic Tween-80 and Span-60 as surfactant. The emulsion was tested on mice skin to check for its penetration and ability to act as dermal filler. Testing the penetration of the HA emulsion was the preliminary aim of this study. The emulsion penetrated the stratum corneum and diffused into the deeper layers of the dermis without the help of any chemical enhancers.

Rupali Shinde (PI: Prof. Ashutosh Kumar)

"Structural analysis of F-Box proteins FBXO31 and FBXO36 involved in SCF complex."

The Skp1-Cul1-F-box protein (SCF) complex constitutes the largest family of E3 ubiquitin ligases. Each F-box protein (FBXW, FBXL and FBXO) is responsible for substrate recognition and hence seven out of seventy two F-box proteins (FBP) to define the structure-function relationship of each complex F-box domain sequences, for conserved regions, structural alignment and template guided structure prediction were analyzed using bioinformatics tools. F-box domain showed sequence similarity and structural homology within and across the classes implying functional similarity. FBXO31 and FBXO36 were over expressed and purified along with Skp1-FBXO36 complex which was co-expressed for further characterization. FBXO31 and FBXO36 could not be expressed independently and with Skp1 complex under different induction parameters. Alternate strategies to express FBXO36 and FBXO31 in bacterial expression system are needed since it is speculated that F-box proteins might be toxic for bacterial cells.



Sneha Ann Joseph (PI: Dr. Ruchi Anand)

Understanding the molecular mechanism of Nucleobase Deaminase

Reliable annotations of enzymes are a substantial challenge in the field of genomic enzymology. A multidisciplinary approach consisting of structural biology, bioinformatics and biochemistry is needed to resolve misannotations of newly introduced genes in the databank. Two uncharacterized deaminases belonging to cytidine deaminase superfamily from mycobacterial species (Mtb and Msd) from the NCBI cluster of orthologous group 0590 (COG0590) were chosen for the study. Sequence similarity network (SSN) was used as primary tool for better understanding of structure-activity relationship of deaminases from the CDA superfamily. Msd and Mtd fall in groups where none of the patients are characterized. Msd and Mtd proteins were cloned, overexpressed, purified and their fuctions were determined. Msd and Mtd were screened with a library of nucleobases and their analogues, where ammeline was found to be the substrate for Msd using Berthelot's reaction.

Shah Komal Rakeshkumar (PI: Prof. Pramod P. Wangikar)

"Optimization and Quantification of Alcohol Dehydrogenase Expression Levels"

Chiral alcohols are of utmost importance in pharmaceutical companies and can be synthesized by chemical as well as biocatalytic methods.. Among the several oxidoreductases available, alcohol dehydrogenase mediated catalysis is primarily used approach for synthesizing preferred enantiomer. Alcohol dehydrogenase is a holoenzyme which utilizes either NADPH or NADH as coenzyme for carrying out reduction of ketones into chiral alcohols. Many such enzymes are produced at commercial level considering their application in the industry using expression system for example bacterial systems. Improved enzyme with desired properties along with optimized production conditions play a key role in the success of any enzyme to be exploited as a biocatalyst. Hence study of alcohol dehydrogenase activity levels is critical and crucial to comprehend supplementary information. Thus, the rationale of the study was to enhance the expression levels of alcohol dehydrogenase protein by optimizing physiological conditions. Also since this protein is a growth associated protein, inducing the cells at the right time would in turn reflect on its protein production levels.

Kanksha Bimal Mistry(PI: Prof. Abhijit Majumder)

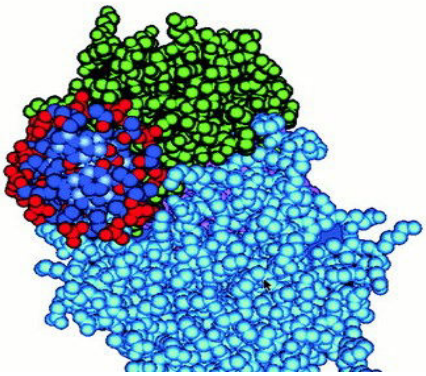
"Controlling morphology, alignment and fate of stem cells using patterned substrate."

Stem cells posses' tremendous applications in the field of tissue engineering and cancer biology, which demands a better understanding of mechanical factors regulating stem cell behaviour. Mechanical factors such as tissue stiffness, topology, shear stress, etc. can influence cellular shape, movement, adhesion. The cells are known to exhibit durotaxis i.e. movement in response to stiffness of substrate and also respond to these different mechanical stimuli by reorganizing their cytoskeleton. Migration is from soft to stiffer region and several mechanical factors have been demonstrated to influence cellular morphology, survival, migration and differentiation via focal adhesion and cytoskeleton. Preparation of a mechanically patterned substrate i.e. an anisotropic substrate using glass beads and PA gel in order to study the behaviour of muscle stem cells (myoblast cell line C2C12) with response to non - uniform substrate stiffness was carried out. An embedded sub-surface structure can lead to cellular alignment and patterning by influencing cellular morphology, contractility and migration was observed. Such studies are beneficial in therapeutics, regenerative medicine, cell therapy; where it would become more convenient in regeneration of tissues in vitro.

Rachel S. Agera(PI: Prof. Pramod Wangikar)

"Physiological and Biochemical Characterization of Locally Isolated Cyanobacteria."

Cyanobacteria are a group of phototropic prokaryotes capable of harvesting solar energy and using carbon dioxide, water to produce its metabolites and biomass. The study on the two cyanobacterial strains namely *Synechococcus* sp. IITB-3 and *Synechococcus* sp. IITB-4 showed a characteristic faster growth rate at ambient and at increased CO_2 levels (0.5%, 1%, 2% and 10%). Their carbohydrate and protein content was also calculated respectively. Based on the results obtained from the study these strains are able to tolerate higher concentrations of carbon dioxide thus making them potential biological agents to sequester the increasing atmospheric carbon dioxide around industrial areas. Since these locally isolated strains have a higher growth rate and thus faster doubling time, both at ambient as well as higher CO_2 they can be further utilized to obtain biomass. The biomass thus obtained can be converted into various industrially relevant products. Also, due to their faster growth rate these strains are potential candidates for genetic modifications, to obtain bio fuels and additional valuable chemical products.



Asha Elizabeth Jose (PI: Dr. Rinti Banerjee)

"Color Changing Transdermal Patch"

Transdermal Drug Delivery System (TDDS) is a form of drug delivery system which carries pharmacologically vital drug to opposite location *in vivo* without any side effects to the user. In this study, colour changing patch was developed that indicates cessation of drug delivered into circulation via skin by changing the colour of the patch in accordance with determined time of dosage. Two different studies were carried out. Initially, a design of patch consisting a membrane covering peeler made of gellan gel with a slit into which the colour indicator material, Curcumin Oil Suspension (COS) was used. On application the peeler was removed, allowing the COS to diffuse across the membrane reacting with the alkali fixed on the opposite side of the patch and giving yellow to red colour transition that acts as indicator. However the diffusion across the membrane was not within a predetermined period. Later study was carried out in two phases, firstly developing a handy, stiff gel and secondly using the synthetic dyes on the gel developed. Mixtures of particular concentration of cationic synthetic dyes were loaded on the anionic gellan gel and later sealed with perforated parafilm sheet of particular design. Cryo-Scanning Electron Microscopy was used to study the water contact angle of the gellan gel with dye. This will revolutionize the current TDDS because of the indicator mechanisms and will be beneficial to products where expiry plays important role.

Porathoor Sini Sunny (PI: Dr. Ruchi Anand)

"Structural and biochemical studies of erm methyltransferases"

Erm family of methyltransferases catalyzes AdoMet dependent modification of A2058 of 23S rRNA in bacteria. This posttranslational modification is one of the key resistance modifications that render the ribosome immune to attack by macrolide, lincosamide and streptogramin B (MLS_B) class of antibiotics. The broad aim of this work was to develop insights into the molecular mechanism of erms, which will serve as a stepping stone towards development of secondary inhibitors that will be able to nullify the effect that these enzymes provide. Therefore, by inhibiting erms, one can resensitize the organisms to existing antibiotics, thus "resist the resistome". Therefore structural and biochemical study on erm methyltransferases was taken up. Two erms were taken for the study- one that confers a mono methyl mark and another that dimethylates ribosomes. The dimethylation mark confers aggressive resistance but also leads to inappropriate translational efficiency. Hence, attempts were made to define the structural elements which confer substrate specificity in mono and di methylating erms. Crystallization of enzyme and *in vitro* methylation studies were adopted and optimisation of the experimental conditions using native proteins was carried out

Merlin Augustine Thomas (PI: Dr. (Prof.) Prashant Phale)

"Microbial Degradation of Aromatic Compounds"

Isolation, characterization and determination of aromatic degrading capability of bacterial strains isolated from Powai Lake were done. The aromatic hydrocarbons chosen were Bisphenol A, Carbaryl, Napthalene, Benzoic acid. S1P consortium is known to have two types of bacterial colonies, S1P1 and S1P2, of which S1P1 showed high ability to degrade BPA than S1P2. Benzoate degradation pathway was deduced for both S1P1 and S1P2 by performing experiments like cell-respiration studies using Oxygraph, time dependent spectral scans and enzyme activity. S1P1 showed Catechol 1,2-dioxygenase activity of 134.4 nmol mg^{-1} min^{-1}, while S1P2 showed an enzyme activity of 458.7 nmol mg^{-1} min^{-1}. Benzoate, catechol, protocatechuate, *para*-hydoxy benzoate were used a substrate for cell respiration studies. The cells showed high oxygen uptake on catechol which is an intermediate in the *ortho*-ring cleavage pathway of benzoic acid metabolism. Thus the metabolic studies carried out-with S1P1 and S1P2 indicate that benzoate is metabolized via catechol as the metabolic intermediat

Swati Shri Pal Singh (PI-Dr. Kiran A. Kulkarni)

"Studies on structural basis of RINI and K-RAS interaction"

Structural studies of R1N1 with RAS GTPases are important to identify the regulatory function of R1N1 as an effector protein. R1N1 and K-RAS were amplified using touchdown PCR and the product was cloned. USER cloning as well as Traditional Ligation cloning strategies was used. Both the genes were cloned into p3E vector having GST tag. The cloned shK-Ras expressed in various expression cell lines, BL12 showing the best expression. The protein was found to be insoluble at 37°C also no significant improvement at 18°C and 16°C. RIN1 expression was tested in different expression cell lines. High level of expression was achieved; however it was observed that RIN1 like shK-Ras was insoluble. BLAST sequence analysis showed that 13 amino acid residues were missing in RIN1 whereas, K-Ras sequence showed a single amino acid change i.e. Arginine instead of glycine. This alteration of amino acid residues can be responsible for improper folding of protein resulting in insoluble protein.

Stacy Vaz (PI: Dr. Ravidas. K. Naik)

"Study of Phytoplankton with reference to Harmful Algal Bloom Species in the Coastal waters of Goa"

Phytoplankton, the photosynthetic microscopic algae are responsible for fixing almost half of the total carbon produced on earth and account for 50% of the Earth's primary productivity. HABs (Harmful Algal Blooms) are considered as an environmental hazard, they degrade the aquatic environment reducing its aesthetic, ecological and recreational value. In the present study, an attempt has been made to study the phytoplankton community structure with reference to HAB species from coastal waters of Goa. This study was also extended to detect the toxin producing ability of the few targeted species belongs to different groups of phytoplankton. The results obtained indicated the presence of HAB species and it was dominated by dinoflagellate followed by diatoms. Screening of toxin from three culture strains belonging to the diatom, dinoflagellate and raphidophyte group (*Heterosigma akashiwo*, *Cylinderotheca closterium and Prorocentrum sigmoids*respectively) using QTOF-LC/MS did not show any peaks that corresponded to the reference toxin values. However *Cylinderotheca, closterium* and *Prorocentrum* culture extracts exhibited peaks very close to known toxin reference.

Smriti Vaswani (PI: Dr. Subhojit Sen)

"Studying differential drug responses using epigenetic phenotypes in Chlamydomonas reinhardtii"

Chlamydomonas reinhardtii, single celled green algae is used as a model system to study epigenetic alterations that can be modulated by drugs. The aim was to test plant derived epigenetically active compounds which could eventually be used for screening anti-cancer properties. In this study a dual reporter system was used to score epigenetic responses by using multiple plasmid constructs to derive differentially regulated epigenetic clones. By developing a phenotypic "Epigenetic Assay", differential effects of known epigenetic drugs such as Decitabine (DNA methylation inhibitor) and sodium butyrate (deacetylation inhibitor) was studied. Further some plant derived compounds, namely curcumin, quercetin, and cinnamic acid for their epigenetic activities were classified. Results demonstrated *Chlamydomonas* as a potential model system for epigenetic silencing as well as relieving of gene expression both by direct as well as indirect mechanisms. Alternate assays for GFP detection that could possibly aid in high throughput screening of clones in response to several epigenetic drugs were developed.

Tata Institute of Fundamental Research
टाटा मूलभूत अनुसंधान संस्थान

राष्ट्रीय प्रतिरक्षा रुधिर विज्ञान संस्थान
National Institute of Immunohaematology

Priya Yadav(PI: Prof. Shyamalava Mazumdar)

"Directed Evolution Studies on a Thermostable Cytochrome P4"

In this study, directed evolution of the thermostable P450 CYP175A1 from *Thermus thermophilus* HB27 (Tm~88°C) using site-saturation mutagenesis has been investigated to achieve efficient alkane hydroxylation. . Here, *E.coli* BL21RP cells with pRSFDuet1 containing CYP175A1 gene and pETDuet1 containing FNR and Fdx genes, were co-transformed to achieve co-expression of all three proteins (CYP175A1, FNR and Fdx). Comparative analysis of co-expressed and separately purified proteins using UV-visible, CD, MALDI and fluorescence spectroscopy techniques were carried out for the detailed characterization and confirmation of co-expression of CYP175A1, FNR and Fdx. The results of UV-visible absorption spectra of co-expression fractions and purified proteins showed the characteristic absorption bands of all three proteins. To engineer the active site of CYP175A1, we have identified 17 amino acids at the distal pocket located within ~10Å of the heme for sequential site-saturation mutagenesis based on the multiple sequence alignment of CYP175A1 from *Thermus thermophilus* HB27 and cytochrome P450 alkane hydroxylase 1.

Shruti S. Pagare (PI: Dr. Manisha Madkaikar)

"Immunophenotypic and molecular characterization of Severe combined immunodeficiency disorders [SCID]"

Molecular characterization of X-SCID and ADA SCID and standardization of T cell proliferation by CFSE using whole blood for paediatric patients was carried out. The preliminary diagnosis of five clinically suspected patients of SCID was performed based on clinical manifestations and enumeration of the total numbers of T cells, B cells, and natural killer (NK) cells. Evaluation for CD132 expression in patients with T- B+ NK- SCID and determination of ADA deficiency in three patients with T-B- NK- SCID was carried out. Direct DNA sequencing method was used for molecular characterization of the above-mentioned genes and analysed using sequence analysis 5.0 software. A novel Q175X homozygous nonsense mutation was identified in a patient with ADA deficiency SCID and a known E68K homozygous missense mutation was found in a patient with X-linked SCID. Standardization of T cell proliferation was carried out using Flow cytometry and 59.8% proliferation was noted which was comparable to the result obtained on PBMCs (56.9%). This will help in providing a base in genetic counselling and prenatal diagnosis in the affected families. In the patients, where the mutations could not be identified in the probable candidate gene, the other genes with a similar immunophenotypic pattern like JAK3, PNP for T-, B+, NK- and T-, B-, NK- respectively need to be screened. A comparison of the T cell proliferation assay on whole blood and PBMCs, reveals that the standardized protocol on whole blood can be used for assessment of T cell function in SCID patients.

Centre for Marine Living Resources & Ecology
MINISTRY OF EARTH SCIENCES

Karan Acharya (PI: Dr. Priyaja P & Dr. Hashim Manjebrayakath)

"Taxonomic and Molecular Identification of Myctophids from the Equatorial Indian Ocean."

Myctophids are the mesopelagic fishes inhabiting the Equatorial Indian Ocean. The identification of myctophids and the development of its unique species specific DNA barcodes aided to bridge the knowledge gap enabling sustainable utilization of the available resources, identified the myctophid species. A molecular taxonomic based study of DNA barcoding a 656 bp region of mitochondrial gene cytochrome c oxidase subunit I (COI) revealed the identity of the species. DNA barcoding enables successful identification at species and genus level which were further confirmed by a bioinformatics study. Evolutionary relationships were analysed by generating a phylogenetic tree for each identified genus (Myctophum, Lampanyctus and Diaphus) using bioinformatics tools such as NCBI BLAST, GenBank, and MEGA6. Genus level phylogenetic trees were generated using DNA barcodes of identified species along with and BOLD barcode records using bioinformatics software. The DNA barcode sequence for *Myctophum spinosum* along with specimen images were successfully deposited in GenBank (Accession number: KU886234) and BOLD. This is the second publicly available DNA barcode of myctophid inhabiting the Equatorial Indian Ocean region till date.

Scientific research involves going beyond the well-trodden and well-tested ideas and theories that form the core of scientific knowledge. During the time scientists are working things out, some results will be right, and others will be wrong. Over time, the right results will emerge.

Lisa Randall

palindrome

"Palindrome is not just a fest, but a platform where a confluence of divergent thoughts and ideas come together to make great things happen."

Palindrome, the annual intercollegiate festival, held by Post Graduate Department of Biotechnology is solely an event 'by the students for the students'. We tried our best to place Palindrome 2016 to the next level of imbibing scientific approach in a fun loving way through different interactive workshops and events. We being of the opinion that it's our duty to give service to the underprivileged and have always been eager to extend our hands for the social cause.

This year our social outreach 'Reach to Teach' is associated with an organization 'REAP'. We will be going to different schools under the aegis of REAP and teaching the students using the teaching aids prepared by the participants and volunteers during the event.

We had Palindrome 2016 hosted by our department on different two days-

30th January was dedicated to Bioinformatics and a Bio-entrepreneurship workshop conducted by experts from the field and was attended by around 130 participants from various colleges in Mumbai. The success of this day gave positive feedbacks during and after the day as an appreciation for all the working hands behind the day's success.

3rd February was a more power packed day having all the events- How I Met My Neuron! , Thea-tickle, Shades of Love, Wolf of Wall Street, Master of Coins, Adrenaline Rush and The Forensic Factor workshop. The participants' energy was infectious and there was neck to neck competition in order to bag the final trophy. Scientific approaches were portrayed in creative ideologies pitched by the participants in different events.

Behind the success of Palindrome 2016 there were many minds involved, several months of brainstorming sessions, planning, logistics and administration, marketing and PR, hospitality management.

Palindrome wouldn't be a success without the involvement of our sponsors Lupin Pharmaceuticals Ltd., Union Bank, Savepocket Money, Fantasie fine chocolates and Himedia.

We are also grateful towards our Principal Dr. Agnelo Menezes, our HOD Dr. Ms Vivien Amonkar, our faculty members Prof. Norine D'souza, Dr. Shiney Peter, Dr. Biswa Prasun Chatterji and our lab attendants, Mr. Rajesh Mahadik and Mr. Prashant Manchekar for their contribution and guidance in the festival.

Last but not the least we would like to thank our participants without whom Palindrome 2016 would never be a success and also the volunteers for their support, patience and endless efforts.

Chair Person- Ketaki Bachal

Vice Chair Person- Urvazi Kotwal

REAP
Reach Education Action Programme

A Literacy Movement Empowering Lives

'We make a living by what we get, but we make a life by what we give.'

- Winston Churchill

St. Xavier's College and it's esteemed faculty members have always encouraged social work and have inculcated seeds of giving back to the society among the students. Palindrome '16, like its predecessors decided to spend a day out with the students of REAP foundation. On that day we had a session with them where we spoke to them, taught them some interesting facts on biology, played with them and also surprised them with sweets and interesting gifts. Our ex principal, Father Frazer helped us to carry out an interactive session with the students of REAP, as he is a part of REAP. It was an incredible experience for all of us, which taught us more than we delivered to those young minds. This social work helped us to evolve more to be a socially sound individual and exposed us to a different world apart from science and research. We thank REAP foundation, Dr. Vivien Amonkar and our faculty members for extending their kind support and giving us an opportunity to serve our society.

It was a valuable and treasured experience being the events head. The position came with excitement, responsibility, power and numerous brainstorming sessions with the team. The most vital activity, as I would like to think, was the inception of ideas, creativity and showing the team a direction and goal to work towards together, simultaneously gauging with their thoughts and feedback I learnt to manage my workload to avoid burning out. In my experience, event organization is very much like an exponential curve. It starts slowly and gradually and as the event nears the workload builds and builds until the event itself,. If you don't manage this properly with yourself and your team then you can burn out. If you don't manage the pressure, you make bad decisions. If you make bad calls, you exert more pressure on yourself As it's said all's well that ends well. It was a cordial learning experience and I'm glad I got the opportunity to be at this position. None of it would have been conceivable without my group and I give the whole credit to them for their support, inspiration and diversion with humor to keep things light when everything appeared to be heated up.

Jay Doshi (Event Head)

BIOINFORMATICS WORSHOP

Resource person: Ms. Norine D'souza

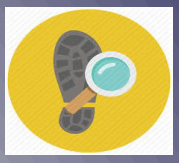
Due to the extensive demand for the workshop, 2 batches were conducted for 3 hours each and the total footfall for this workshop was 57 participants from different colleges. Along with lectures carried out on the various topics, hands on training were also provided by our resource person who was very much appreciated by the students. A template was provided which had the stepwise procedure for using various tools in bioinformatics. After an extensive session a positive feedback was obtained from the participants. They wished for such workshops to be regularly conducted and for longer hours. They also enjoyed working with the various software's as it helped them obtain a clearer picture regarding the bioinformatics tools.

BIOENTREPRENEURSHIP WORKSHOP

Resource person: Mr. George M Thakaran (MD. Alltrack Tracking Solutions Pvt Ltd)

Mr. George gave the participants a good insight regarding entrepreneurship and the required skills to set up a business. He gave them valuable tips that they could follow in future in case the students decided to take up that field, these tips could also help them in the entrepreneurship event. He also gave the participants his own life example and spoke about his experience, years of hard work and how he set up his firm. The students could relate well with him as most of his talk was based on his personal experience. He spoke about the step wise procedures of setting up a business and how to get and maintain the finances as well. The total footfall for this workshop was 74 participants from different colleges. The students responded well to the talk and gave a positive feedback as they enjoyed hearing the speaker's experience. Participants are looking forward to attending such a workshop again.

THE FORENSIC FACTOR



It was conducted by Mrs Aloki Doshi, MsAnthea Vaz and Ms Zarina Sheikh of the forensics department of St. Xavier's College. 60 students from different colleges participated in this workshop. The workshop started at 11am where Mrs. Doshi explained to the students the basics of forensics using real life examples to help students understand the little details of it efficiently. She explained to them about fingerprints, handwriting analysis, how blood smears at crime scenes can help in identifying criminals, chemical analysis wherein different techniques like chromatography are used, how the police and CSI (Crime Scene Investigator) team work together to solve crime related cases, etc. After the talk which lasted for about one and a half hour, the students were given a quiz to solve. Later the students were divided into groups of 10 and were given a chance to test their newly acquired knowledge to solve a crime scene. At the end of 30 minutes the papers were collected, analyzed and the winning team was declared by Ms Doshi. The success of the workshop laid in the fact that every participant was actively involved and sure to take the memory of this educating yet fun filled workshop along with them.

Niral D'silva (Event Co-ordinator)

BIOENTREPRENEURSHIP

This event was planned to offer a platform for the biological science students to explore their knowledge of bioscience/biotech to develop a product and use the principles of entrepreneurship to market the product to attain a commercial value. Keeping this goal in our mind we had set up 3 case studies related to the field of environment, cosmetics and diagnostics. The participants had to choose from these 3 case studies and come up with their own novel ideas. Our judges for the event were Mr Hrishikesh Pandit and Mr Allen Rodrigues. We had a participation of 5 teams consisting of 2 per team.

The first round tested the participants writing, planning and execution skills .Each team was given a time of 5 minutes to pitch their ideas to the judges followed by question from the judges. From the first round 4 teams were selected to the second round which was a debate round. The debate round was a platform for the teams to put forth the superiority of their product and to convince the audience as to why their product is the best. This was followed by questions from the audience. The first place winners were Ms Jareen Joseph and Ms Madiha Shaikh from KC college who won a cash prize of Rs 2000 and and second place winners were Ms Pooja Gowda and Ms Apurva Takke from RJ college who won a cash prize of Rs 1000. The event was indeed challenging at every step to find a young Entrepreneur from Palinfrome2016

Percival D'gama (Event Co-ordinator)

SHADES OF LOVE

The event which brought the creative side of the participants was chiefly associated with our social cause "REACH TO TEACH". The participants were given on the spot topics based on basic science. The participants were very eager and painted their heart out in these posters making it very attractive and interactive. The judges were very glad to see these enthusiastic responses from the participants that they gave away two special prizes along with the first prize. The first prize winner made an interactive poster that can be easily used to teach any age group and they made use of normal ideas in their posters by using papers to make cutouts making it more attractive. The special prizes were given to two posters that were easily explaining the given topic. The volunteers and teachers also gave their share in this event by making posters. The posters made by the participants as well as the volunteers were used to teach the students belonging to the age group of 6 to 13 years at "REAP NGO".

Snehal Bamane (Event Co-ordinator)

THEA- TICKLE

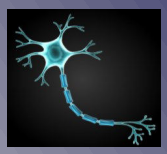
It is correctly said that Actions speak louder than words. The actions of a few actors can leave a more lingering effect on the masses. This idea formed the basis of our Skit-event, THEA-TICKLE. The topics for the event were Apoptosis, Signal Transduction and In-vitro Fertilization. To elevate the competitive spirit among the contestants the topic had to be scripted in the form of a Musical Play. The event was graced by the presence of Ms. Norine Dzousa and Ms.Juliah Chelliah, who were the judges for the day.

A total of 3 team's (15 participants) from different colleges participated in the event. The teams conveyed their ideas better by using vibrant and factual properties. Each of the teams was given a time period of 7 minutes to complete their act.

The judging of the acts was based on the ideas, ingenuity, resourcefulness, artistry and time limit followed by the teams. The team from B.N Bandodkar College grabbed the first prize for their enthusiastic and playful performance, followed by the team from KC College winning the second prize. The event ended on a joyful note after which the contestants were dispersed for lunch.

Joel John (Event Co-ordinator)

HOW I MET MY NEURON



"I think what makes 'Jeopardy!' special is that, among all the quiz and games out there, ours tends to encourage learning"

Quizling's as we called ourselves, had an amazing experience in formulating and carrying out the event with a lot of enthusiasm and crazy. We learnt a great deal of skills like team dynamics, co-operation and not forgetting the most obvious, knowledge through our information packed events. It all started with the morning newspaper, The Neuron Daily, which was the first and the most ruthless round of all because it filtered many teams to proceed to the second round. Mirror Neurons, the next test was a video round that not only tested your knowledge but also how alert your senses could be to pick out the correct answer. And the finale, the one we all cherished, was a game of Neurojeopardy which had some twists and turns in it. The teams from SIES College bagged the first prize and the runner ups title. The awesome feedback from the teams and the crew made us all happy and delighted.

The success of How I Met My Neuron is contributed to many, right from The Almighty to the PG Department of Biotechnology and most importantly Dr. Biswa Prasun Chatterji for his time and input.

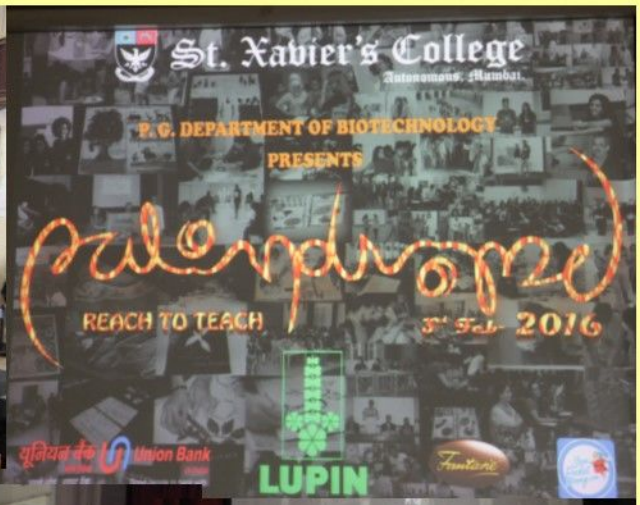
The Quizlings

(Akeeth, Akshay, Chinna, , Niral, Prachiti, Yash)

ADRENALINE RUSH

A fun event based on biology concepts for the participants where players had to participate in teams (2 per team). The game had 4 rounds and every team got a chance to play all 4 rounds. Round 1 was Pictionary, round 2 rings the answer, round 3 perception and round 4 card flipping. Total 23 teams had participated. The games were played in 2 batches. Every team was marked at all 4 rounds for their performance. On basis of the final scores, out of 23 teams 4 teams were selected for the final round. The final round was a rapid fire round where the teams were marked and on basis of their score winners was declared. The 1st prize was given to Mayuresh and Zeeshan from SIES College and 2nd prize was given to Vaishnavi and Seher from Jai Hind College.

Dipali Shah (Event Co-ordinator)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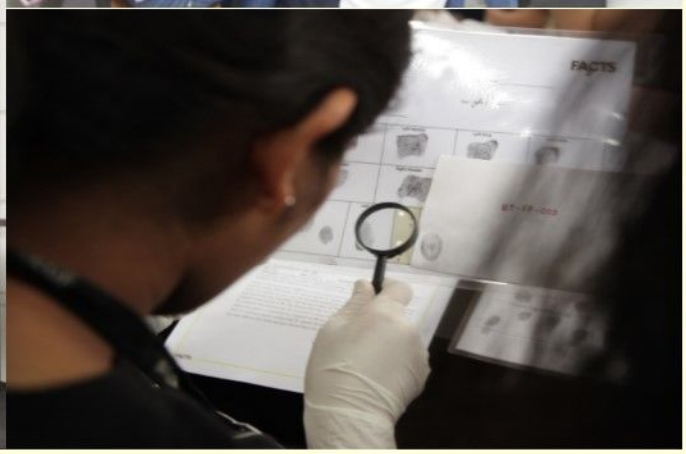
P.G. DEPARTMENT OF BIOTECHNOLOGY
PRESENTS
REACH TO TEACH
2016
Union Bank
LUPIN


FACTS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INDUSTRIAL VISIT–GOA.....

The Department of Biotechnology at St. Xavier's College - Autonomous, Mumbai organized an Industrial Visit to Goa from Monday, 30th November 2015 to Saturday, 5th December 2015 for us, the students of M.Sc.Part I (Biotechnology). The industries covered were National Centre for Antarctic and Ocean Research (NCAOR), Monginis Foods, Coca-Cola Company and Goa Dairy. We were accompanied by two of our faculty members - Dr. Shiney Peter and Mrs. Norine D'Souza. The tour was operated by Khushi Holidays Pvt. Ltd.

NCAOR Goa

We visited NCAOR on 1st December. It was the first industry we visited in Goa. Dr. M. V. Ramesh spoke to us on various topics. We were first briefed about the continent of Antarctica, its flora and fauna and why it's an ideal place for scientific research. Then we were acquainted with NCAOR and its past and ongoing projects. He further continued that a ship called Sagar Kanya belongs to the Department of Ocean Development and is the responsibility of NCAOR, and it is well equipped with scientific research equipment like, echo sounder, the demo graph and emergency evacuation facility for assisting the on going research projects. The various activities of the NCAOR are as follows:

-Arctic Research

-R & D Programs

-Technical Vessel Management

-EEZ Survey

-Indian Continental Shelf Program

-Management of Antarctic Expedition

Academic Learning: We were shown different types of microscopes- like the Scanning Electron Microscope (SEM) - and the various methodologies that are used to culture, preserve and observe micro-organisms that have been isolated from Antarctica. We also had a look at the pictures of these micro-organisms. This study was important as the micro-organisms can give us information regarding different aspects of the continent. Such an exposure would definitely not have been possible elsewhere.

Monginis Foods

The second industry we visited was the Monginis Foods' Processing Unit at Madgaon on 2nd December. We were shown around the place. We saw how the cakes were made and decorated. We got an insight into how specialized cakes were made by using laser technology and how photo cakes were prepared with edible sheets and edible ink.

Academic Learning: We saw different processes that are used in cake production. We also had a look at the quality control lab.

The Coca-Cola Company

On the same day, i.e. 2nd December, we visited the third industry in Goa - The Coca-Cola Company. The Coca-Cola plant processes Thumbs Up, Sprite, Fanta, Limca, Coca-Cola and many other beverages. The plant is almost completely automated, with very few processes requiring a manual operator. The bottling process happens very fast and is highly efficient. The beverages are prepared by running a mixture of sugar and water over a bed of filter papers. The remaining ingredients are added and missed in the mixing tank. The plant which we saw, received the ingredients in the form of concentrated syrup from their central processing plant. The concentrated syrup is the diluted in a particular proportion to get the final product. The water used is obtained either through government water supply, tanker or wells depending on the location of the plant.

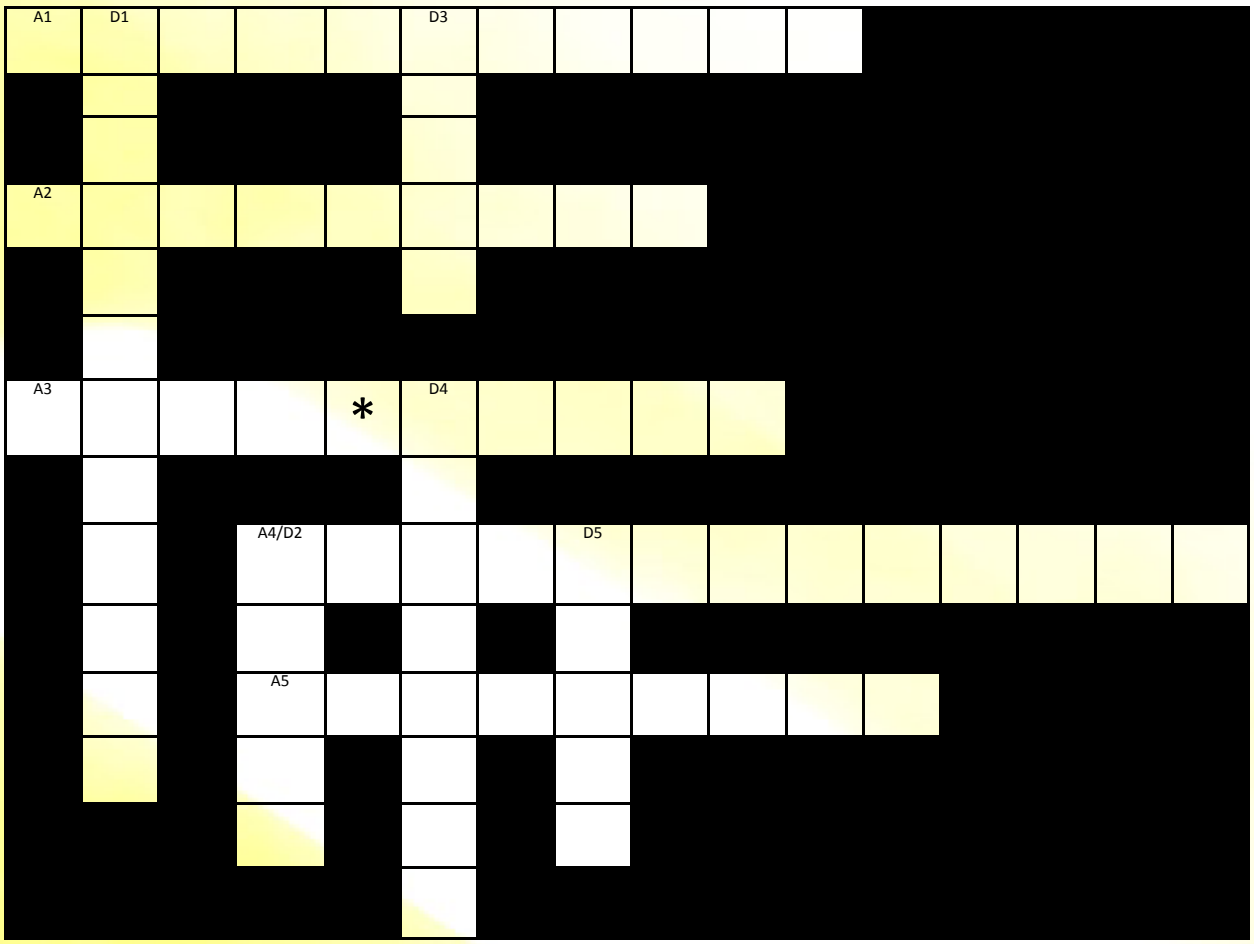
Academic Learning: We learned about the different machines involved in the beverages' production. We also had a look at the mechanism of bottling. Though they did not reveal their "secret formula" for manufacturing the beverages, they did give us an idea as to how they are prepared from the concentrated concoction. We also got a chance to see firsthand, an actual industrial set up and their organization. We also learned about the various sterilization protocols that are followed in such industries.

Goa Dairy

The final (fourth) industry we visited was the Goa Dairy at Curti, Ponda on 4th December. We were acquainted with many of the processes that are a part of the dairy industry, including the quality control. It was established in 1970 and is the only co-operative dairy in Goa. It has about 70 staff workers and managers that work in two shifts. The milk (either buffalo milk or cow milk) is obtained majorly from collection society or from BMC. This milk is then pasteurized and packaged. It is also subjected to testing. The plant also produces many other milk products like ice cream, flavoured milk, butter ghee and lassi. They are sold as individual units in Tetra Pak packaging. We were shown around the place by the supervisor of the plant and we saw that the waste water which is generated by the plant is passed through the ATP plant and post treatment, the water is let out in the sewage.

Academic Learning: At the Goa Dairy plant, we had a look at the Electronic Milk Tester for the very first time. We also got a chance to actually have a look at how the standard tests for milk are carried out and the various instruments that are used for the same.

INDUSTRIAL VISIT– GOA



ACROSS:

A1- Process of addition of acetyl group

A2- The process of degradation of cellular proteins is regulated by _____

A3- A dye used in Real-Time PCR

A4- Study of evolutionary relationship

A5- Class of enzyme that converts glucose-6-phosphate to fructose-6-phosphate.

DOWN:

D1- Nature of ABO Blood group antigen

D2- Infectious agent that causes Mad Cow Disease.

D3- Another word for "fat"

D4- Animal starch is also called _____

D5- A monounsaturated ω-9 fatty acid.

UNIVERSE AND US

My blood is just like the sea - saline and life giving,
My heart -the earth, following rhythms; reason for my living,
My soul -the sun, steady, strong; source of all that there is.
The hair on my head like the leaves on a tree,
The pores on my skin; the grains of sand on our land,
The love in my heart; the glimmer of the stars I can't contain in my hands.
The cells in my body are like the people that have come and gone,
At this moment some are dead ,some living and some born.
There are soldiers, nurses, teachers, learners in me and around me.
Some kill to live some live to die some just be.
A single cell is the reason for the most beautiful miracle of birth.
A single cell can lead to the terror of cancer and make known its worth.
Just as humans have a choice, cells have a code.
It is upon us to choose to be the poison or the antidote.
It is a tragedy and a mystery,
Why we search ourselves in history;
Why we doubt our capabilities and depend on other energies,
I've learnt we must believe infinitely cause,
We are the reflection of the universe and the universe is in us.

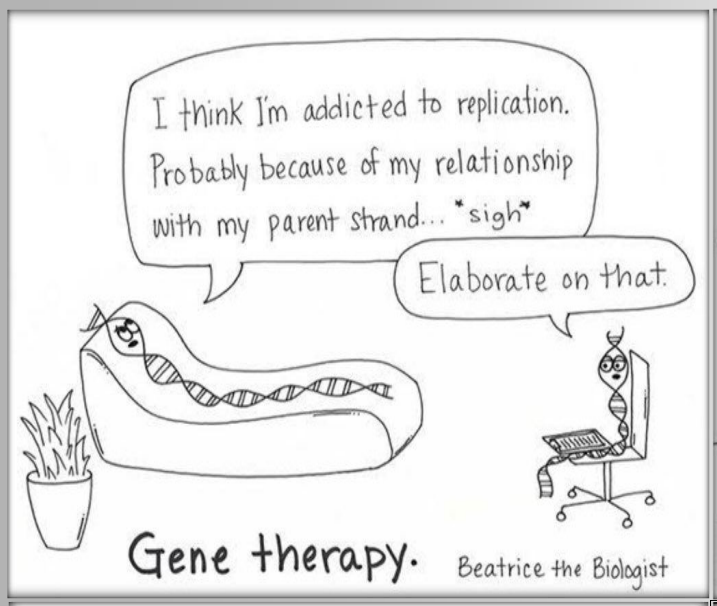
- Minoshka Jones
MSc II 2015-2017

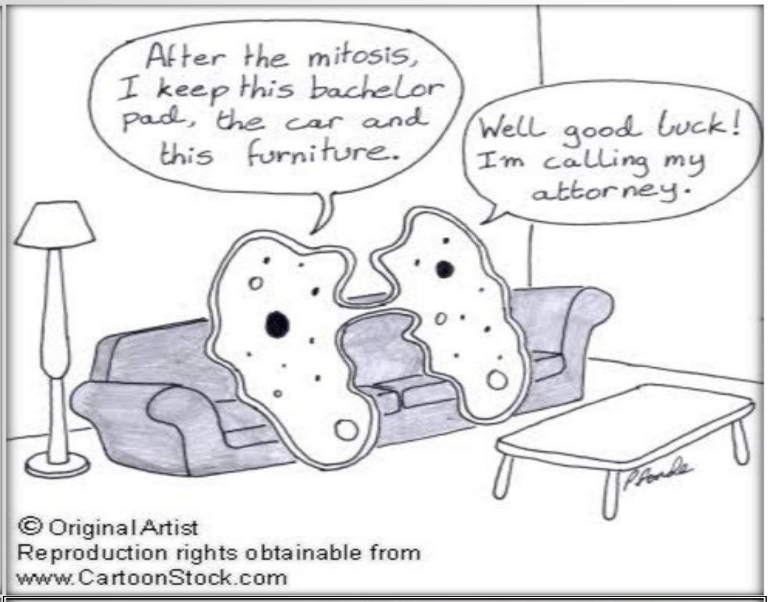
HOBBY PASSION AND MORE....

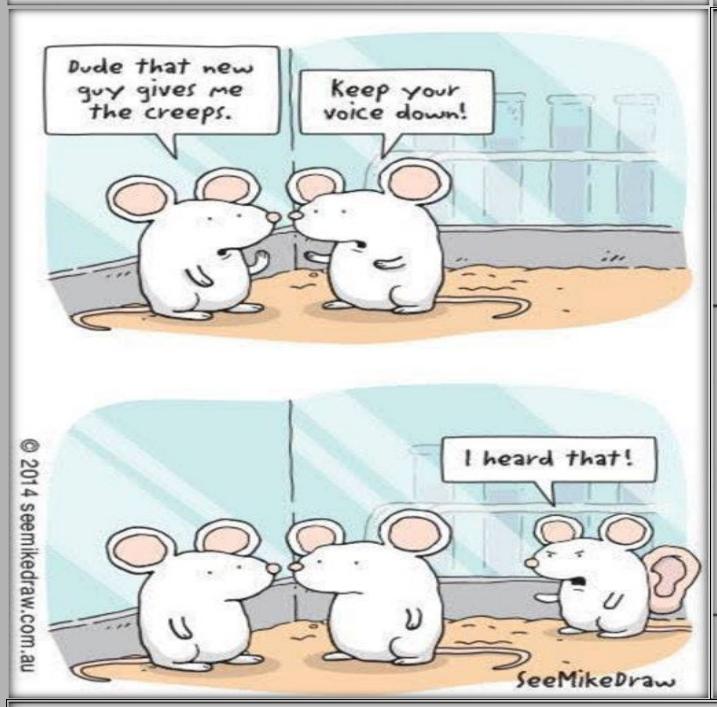
It's a common belief that fine arts are exclusive. Nevertheless, for me art is not a touch that you have to study to understand and appreciate. Born as an introvert, art for me was always an effective means of communication. It is something that captures the eye. For me the most important thing what makes an art beautiful is the perspective of the audience. It is something that have always inspired me and motivated me to move forward. In spite of being a science student, art has its own place in my life. It's not just a hobby but its ways more than a passion and for me passion is something I believe you should LIVE YOUR LIFE FOR!

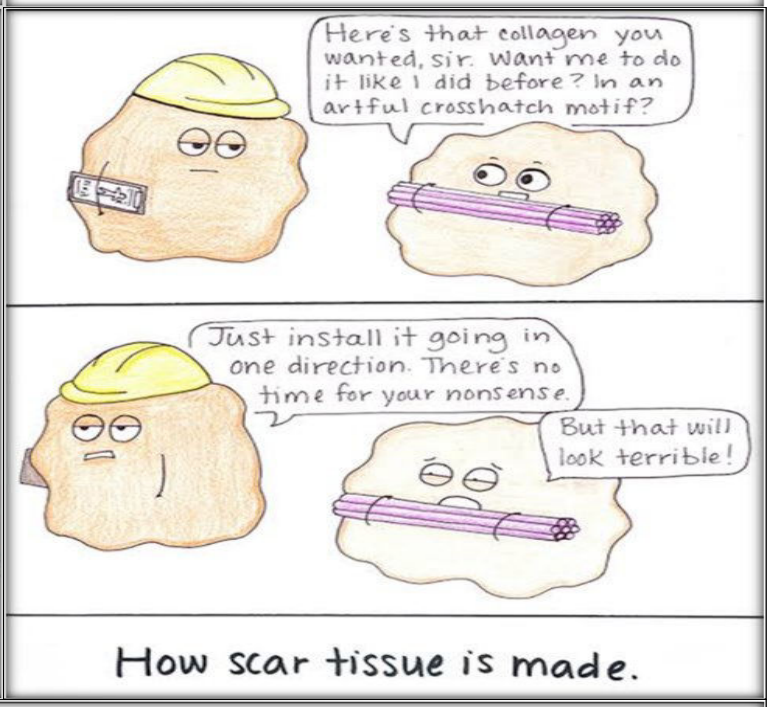
-Ankita Rane
MSc II 2015-2017

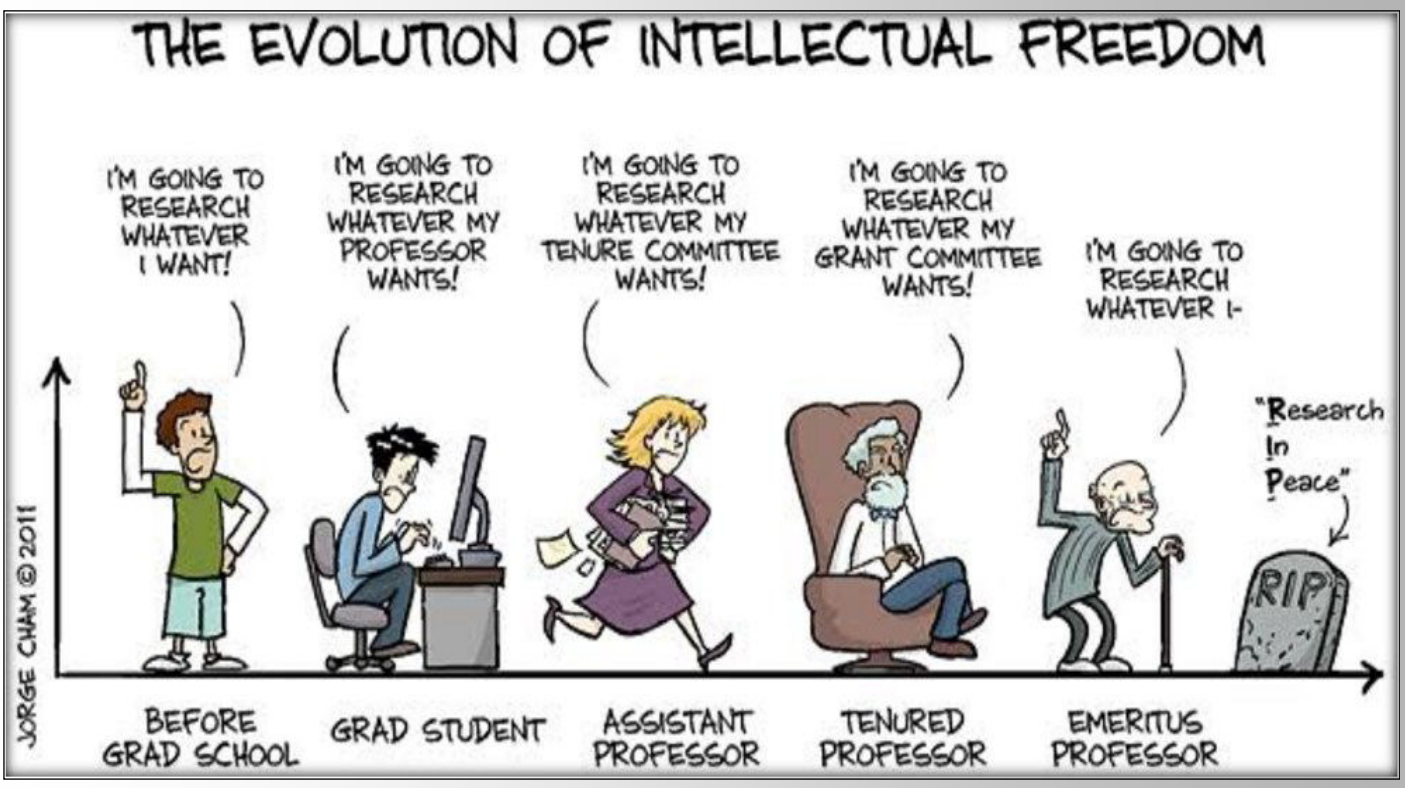
COMIC CORNER.....



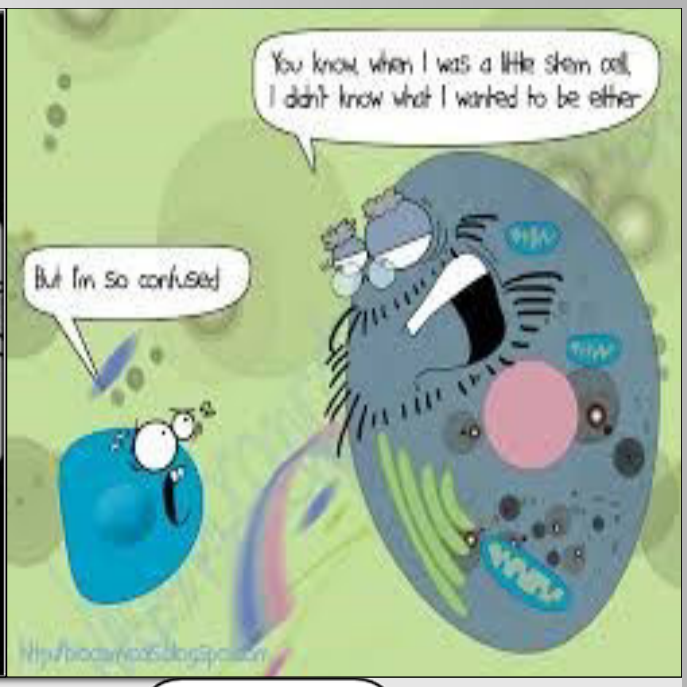


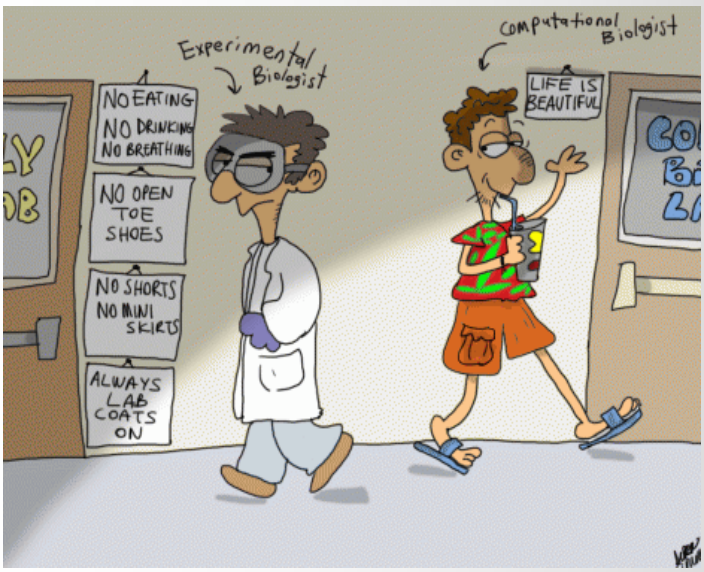


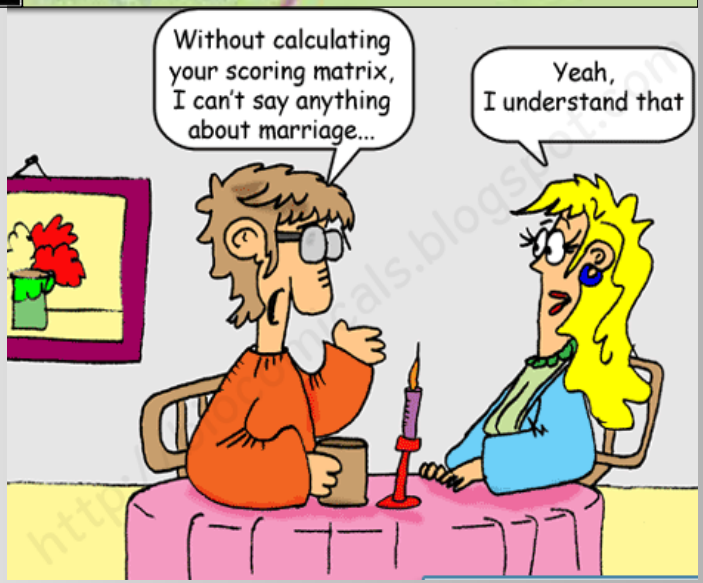



THE EVOLUTION OF INTELLECTUAL FREEDOM
I'M GOING TO RESEARCH WHATEVER I WANT!
I'M GOING TO RESEARCH WHATEVER MY PROFESSOR WANTS!
I'M GOING TO RESEARCH WHATEVER MY TENURE COMMITTEE WANTS!
I'M GOING TO RESEARCH WHATEVER MY GRANT COMMITTEE WANTS!
I'M GOING TO RESEARCH WHATEVER I-
"Research In Peace"
RIP
JORGE CHAM © 2011
BEFORE GRAD SCHOOL
GRAD STUDENT
ASSISTANT PROFESSOR
TENURED PROFESSOR
EMERITUS PROFESSOR


THERE WAS THIS HUGE EYE THAT WOULDN'T STOP STARING AT ME!
IT'S JUST THE MICROSCOPE DREAM AGAIN... GO BACK TO SLEEP!
5-30
Facebook.com/FreeRangeComic


You know, when I was a little stem cell, I didn't know what I wanted to be either
But I'm so confused


Experimental Biologist
Computational Biologist
NO EATING
NO DRINKING
NO BREATHING
NO OPEN TOE SHOES
NO SHORTS
NO MINI SKIRTS
ALWAYS LAB COATS ON
LIFE IS BEAUTIFUL


Without calculating your scoring matrix, I can't say anything about marriage...
Yeah, I understand that

Nature Journal

Science Magazine

ACBS.org

American Soceity for Biochemistry and Molecular Biology

IndiaBioscience

Biotech Consortium India Limited

Clinical Trials India

Traditional Knowledge Digital Library

helpBIOTECH

WEB CONNECT

ActionBioScience.org

BioJobBlog

BioJobNet

Biocom Institute

BioSpace

Chemistry.org

Nature Jobs

Biospectrum India

Biotecknika

PharmaTutor

Source : World Wide Web

FAMOUS QUOTES!!

“Facts are the air of Scientist. Without them they cannot fly”

-LINUS PAULING

“The role of the infinitely small in nature is infinitely great.”

-ALBERT EINSTEIN

“The true Science of knowledge is not knowledge but imagination”

-ALBERT EINSTEIN

“Change is the only source of true novelty”

-FRANCIS CRICK

“A fact acquires its true and fully value only through the idea which is developed from it”

-JUSTUS VON LIEBIG

“Research is what I’m doing when I don’t know what I’m doing”

WERNHER VON BRAUN

FAMOUS QUOTES!!

“Every great advance in science has issued from a new audacity of imagination”

-JOHN DEWEY

“The science of today is the technology of tomorrow”

-EDWARD TELLER

“You cannot teach a man anything; you can only help him discover it in himself.”

-GALILEO

"Imagination is more important than knowledge."

-EINSTEIN

“Science is simply common sense at its best”

-THOMAS HUXLEY

“Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world.”

-LOUIS PASTEUR

OUR DEPARTMENT....

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2014-16

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