



INSPIRED BY LIFE

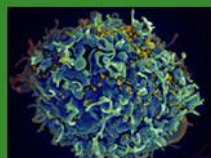


School of Life Sciences

Newsletter



Latest News



Research Highlights



Funs and Puzzles

Science

Of Bats and Bagels

-Shyamala Inumella, B.Sc Biotechnology Year II

Bats are unique creatures owing to the fact that they are the only mammals that possess the true ability to fly. Belonging to the order Chiroptera, they are predominantly nocturnal creatures. While most bats are considered 'blind' due to their poor eyesight, they still boast of a fascinating navigation system called echolocation.

Arseny Finkelstein and others at the Ulanovsky Lab of Neurobiology, Israel, conducted detailed studies on the Egyptian fruit bat (*Rousettus aegyptiacus*) to learn more about the complex internal 'compass' they are believed to possess.

To comprehend this innate capacity, neural recordings were taken up to the level of a single neuron firing. Specialized neurons called 'head direction cells' (HD cells) were targeted in this process. These HD cells are found in several regions of the brain and fire only when the head of an animal is oriented towards or near a particular plane. In addition to the HD cells, neurons called 'pitch cells' were also found to be involved in three-dimensional navigation.

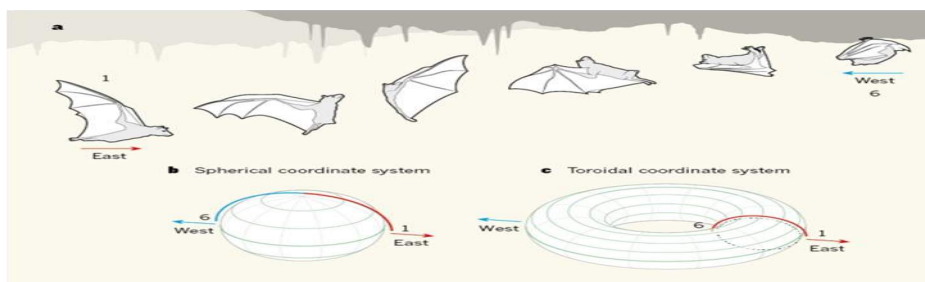


Image: a. 'Flip' maneuvers of bats b. Spherical coordinate system c. Toroidal coordinate system (Jasiek Krzysztofciak/Nature)

The neural recordings were taken for various positions and orientations of the fruit bats; first two-dimensional and later, three-dimensional motions. The activity of the various scattered clusters of HD cells and pitch cells was recorded. The results showed that while the head direction cells fired according to the horizontal plane, the pitch cells fired according to the pitch, angle, and roll of the bat's movement.

To understand this better, scientists studied a specific maneuver extensively – the 'bat flip maneuver' in which the bat flips nearly 270 degrees to hang upside down in its resting position. Interestingly, the earlier belief that the internal compass represented three dimensional spaces as a sphere was disproved by this study. Instead, 3-D space in bats was represented in a toroidal form- the shape of bagel.

This toroid shape manifests due to azimuth cells - cells that depend on the angle of horizontal movement. When a bat changes its orientation from, say, the geographical horizontal to the vertical, these azimuth cells adjust themselves and realign to the new orientation. This results in inversion by 180 degrees. This means that the bats think they are upright when they are in fact, hanging upside down.

The toroidal co- ordination system thus offers a more gradual change in longitude than the spherical one. Further studies might provide deeper insight to phenomena such as disorientation, vertigo, etc.

Reference: Arseny Finkelstein, Dori Derdikman, Alon Rubin, Jakob N. Foerster, Liora Las & Nachum Ulanovsky "Three-dimensional head-direction coding in the bat brain", *Nature*. www.nature.com/articles/nature14031 (3rd Dec, 2014) .

Rainforests of the oceans hiding a cure for HIV?

- Samayitree Das, B.Sc Biotechnology Year II

Considered as the home to the ocean's delicate mysteries, have now intrigued the scientific community for yet another significant therapeutic reason. Scientists have identified a protein which can prevent the HIV transmission.

The proteins are called Cnidarins, extracted from feathery coral in northern coast of Australia. These proteins have a potential mechanism of blocking HIV infection.



Cnidarins get bound to the virus & prevent the virus to fuse with T-cell membrane. At a concentration of a billionth of a gram of purified coral protein can amazingly block HIV virus to penetrate T-cells. Researchers in National Cancer Institute have told that Cnidarins have a property of blocking HIV infection without making other drugs resistant to it.

This coral protein is a natural product. We cannot strip the whole coral reef to produce Cnidarins. As a result scientists are finding a way to generate larger quantity of Cnidarin from small amount. These large amount of protein can be used to screen the side effects & potential activity of Cnidarins against other viruses. Cni-

darin can be used as a barrier to HIV virus in gels or sexual lubricants. National Cancer Institute has a collection of natural products in a form of biorepository. These natural treasures are helping the researchers to discover a way of relief caused by deadly diseases.

References: The FASEB Journal, April 2014, Vol. 28, No. 1, Supplement 975.6 (www.fasebj.org)

HIV Pathogenesis Slowing As The Virus Evolves

- Anirudh, B.Sc Biotechnology Year I

An Introduction:

A study conducted by the University of Oxford gave hope and good news during December 2014, coinciding with the World AIDS Day. The researchers found that the deadly human immunodeficiency virus(HIV), the causative organism of acquired immunodeficiency syndrome (AIDS), was slowing down in its ability to cause the disease as a result of its evolution to adapt to the variety of drugs being used to combat it.

This is particularly good news as, according to the WHO, there was about 35 million people carrying the HIV infection in 2013 and almost 40 million people have died of AIDS till date. A precise drug to combat the virus has not been synthesised yet, but the current report shows a significant victory for the scientific

community which has so ardently been working towards the eradication of the virus.

The Facts:

The University of Oxford, along with collaborators from USA, South Africa, Botswana and Japan, conducted the study using 2000 HIV-infected women in Botswana and South Africa, statistically shown as the two countries with the greatest number of reported infections.

The study comprised two parts. The first part tested the body's natural immune system, i.e., they tested if the body's natural immune system and its interaction with the virus were causing the virus to lose its virulence. The second part checked for the effect of drugs and treatments on the potency of the virus. The study results were published in the journal *Proceedings of the National Academy of Science (PNAS)* in December (Payne *et al*, 2014).

The Science:

For the first part of the study, we need to understand a few immunological factors which regulate the protection of the human body against HIV. There are certain proteins found in the blood, known as Human Leukocyte Antigens, or HLAs. These proteins allow the host immune system to selectively identify proteins as that of either the host or a pathogen. Among the numerous HLAs, there is one particular protein, the HLA-B57, which is especially helpful in the identification of HIV. Those with the gene for the expression of HLA-B57 have an advantage over others since the onset of AIDS is slightly delayed due to the expression of this protein. However, in places like Botswana for example, the HIV has started to adapt to HLA-B57, providing no protective effect, but not in other places like South Africa.

The second part of the study, which sought to observe the relation between antiretroviral therapy (ART) and HIV virulence, requires some understanding of the immune systems of the severely infected patients. There is a protein called CD4 which is found on the surface of T-cells. Naturally, as an effect of HIV, the count of this protein is drastically reduced. This is an excellent marker for immunological disorders. Using certain mathematical models, the scientists at Oxford University extrapolated the effect of something called "selective treatment" on patients of HIV with extremely low CD4 count.

The Result:

The first part of the study revealed that the adaptation of the virus to HLA-B57 had caused it to experience a reduction in its replicative ability, thereby causing a decrease in its virulence. The second part of the study showed that selective treatment of those patients forced HIV to evolve at an accelerated rate, thereby causing it to part with its ability to replicate, therefore causing its effects to decrease.

Discussion:

This study helps in our understanding of the HIV evolution patterns and justifies that ART is moving in the right direction in treating HIV. Based on these findings, it can be concluded that the exertion of selective pressure on the virus will cause it to evolve further, thereby forcing it to possibly lose its virulence. Statistics show that there has been some increase in the time taken for the onset of AIDS from the initial infection of the virus since its emergence three decades earlier. This in itself is a great ray of hope as it indicates that in the coming decades, we could be looking at a potentially dormant HIV.

Reference:

Payne R, Muenchhoff M, Mann J, Roberts HE, Matthews P, Adland E, Hempenstall A, Huang K-H, Brockman M, Brumme Z, Sinclair M, Miura T, Frater J, Essex M, Shapiro R, Walker BD, Ndung'u T, McLean AR, Carlson JM, Goulder PJR. 2014. Impact of HLA-driven HIV adaptation on virulence in populations of high HIV seroprevalence. *Proceedings of the National Academy of Sciences of the USA*, 111:E5393-E5400.

Events

International Students Day at School of Life Sciences, Manipal University Students do make a difference....

On the occasion of the International Students Day and as part of the directive from the University Grants Commission (India), on 17th of November 2014 the Student Council of School of Life Sciences (SLS), Manipal University, organized a group discussion on the various aspects of the Indian educational system, its pros and cons and opinions of the students on how they feel, how the system can undergo alterations for the better. The enthusiastic students of SLS were segregated into five groups and given the following topics of discussion:

1. Different boards of education in India
2. Entrance examinations
3. Implementation and management of co-curricular and extra-curricular activities
4. Indian Collegiate System
5. Biotechnology academia



After twenty minutes of brainstorming, the groups came up with various ideas pertaining to each topic and shared them to the audience with candour. A brief summary of the important opinions of the students is given below.

- A) The students opined that a single Educational board with affordability to a wide spectrum of students would be preferable. The syllabus and the grading system should also be standardized. Emphasis was given to the development of a curriculum which endows equal importance to practical application of the taught subjects.
- B) The students also suggested the implementation of a single entrance examination for a particular stream. This would facilitate concentrated efforts of studying.
- C) The extra-curricular activities were given “thumbs-up” for the holistic development of any student.

- D) Reservation was a great concern voiced by the students and views were expressed as to its removal, especially while inclusion into educational institutes or job considerations.
- E) The idea of teaching the students of middle school briefly about various advanced sciences subjects, available for their pursuit was put forth.
- F) Increase in the recruitment of teachers was suggested due to low student:teacher ratio.
- G) For wholesome knowledge of advanced sciences and their application in industry, increase in the number of internships offered was put forth.
- H) For exposure to the rapid pace of the growth of advanced sciences across the globe, suggestions for Exchange Programmes and Fellowship tie-ups with foreign universities was requested.
- I) The requirement of a Disaster Management System at schools and colleges was suggested.



It was not all plain speaking though. First year students of the MSc course performed skits depicting importance of girl-child education, prevention of child labour and sex education. Participants of the forum included the faculty members and the research scholars.

The day was also marked by the release of the new 'e-Newsletter' of the School of Life Sciences, by the Students Council. The Director, Dr. K Satyamoorthy, explained the initiative and efforts behind the release of the same and wished the students well in bringing out the issue, while hoping that there would more of the newsletters to come in future.



4th Annual Conference of the Society for Mitochondrial Research and Medicine: Mitochondrial Biology: from Molecules to Disease

December 8-9, 2014

- Poorva Huilgol, M.Sc, Year I

The 4th Annual Conference of the Society for Mitochondrial Research and Medicine (SMRM) on 'Mitochondrial Biology: from Molecules to Disease' and organized by the School of Life Sciences (SLS), Manipal University, was inaugurated on December 8, 2014 at the Fortune Inn Valley View at Manipal by the Pro-Chancellor of Manipal University, Dr. HS Ballal and the former Vice-Chancellor of Banaras Hindu University, Dr. Lalji Singh.

Inaugurating the conference, **Dr. HS Ballal** spoke of the need for India's universities to be among the world university rankings, which would be possible only if active research was promoted by the country's universities. He said that conferences on cutting edge topics such as the one on mitochondrial research were a step in the right direction.

In his keynote address, **Dr. Lalji Singh** gave a detailed description of the nature and im-



portance of mitochondria in every cell of the body. He listed the varied functions of this cellular organelle, which is mostly thought of as the energy supplier of the cell (powerhouse of the cell). However recent research in this field has shown its implications in several disorders as well as in heredity and evolution. Indian researchers have been among the pioneers in this field, and Dr. Lalji Singh pointed out that due to its enormous implications in the field of human health, further work on this exciting field becomes imperative. He gave examples of the significance of mitochondria in human reproduction and wished that in future the remarkable orga-

nelle would be the focus of human diversity, forensics as well as quality ageing. Earlier, Dr. K Satyamoorthy (Director, SLS & President, SMRM) welcomed the gathering. Dr. K Thangaraj (CCMB, Hyderabad) and Dr. N Gayathri (NIMHANS, Bengaluru) were present. Dr. Sanjiban Chakrabarty delivered the vote of thanks.

The first scientific session was on on 'Mitochondrial Biomarkers and Diseases' and chaired by *Dr. Keshav Singh* and *Dr. Gayathri N.* The first speaker of the session was **Dr. Satish P Ramachandra Rao** (University of California, San Diego, USA) on "Exosome Paradigm of Mitochondrial Dysfunction: Clinical Utility in studying Kidney Failure". Beginning his talk by defining the characteristics of exosomes and how they reflect the biology of the cell by differing in the contents during health and diseased conditions, he focused on study of patients who underwent cardiac surgery and also have acute kidney injury (AKI) and concluded that exosomes could be used as indicators or biomarkers for mitochondrial mutations. The second speaker of the session was **Dr. Upender Manne** (University of Alabama, Birmingham, USA) on "Evidence-based care requires development of patient population-specific molecular biomarkers: colorectal cancer". Dr. Manne highlighted the need for the discovery of markers for early diagnosis and effective therapy. He men-

Dr. Manne highlighted the need for the discovery of markers for early diagnosis and effective therapy. He mentioned about the different tumor development and progression biomarkers like early diagnosis (population/individual), prognosis, surrogates and surveillances and their clinical utilities, citing various examples. The last speaker of the session was **Dr. Anshu Bhadrwaj** (OSDD-CSIR, New Delhi, India) on the topic “MitoLINK: an integrated web-based platform for evaluating genotype-phenotype correlation for human mtDNA”. Her talk dealt with the documentation of mitochondrial variations, along with their clinical significance to associate their role in the wide range of mitochondrial diseases reported so far.



The next session on ‘*Mitochondria: Clinical Perspectives*’ was chaired by *Dr. Shashikiran Umakanth* and *Dr. Sundaresan Periasamy*. **Dr. Josef Finsterer** (Krankenanstalt Rudolfstiftung, Vienna, Austria) started the proceedings on “Mitocardiopathy: cardiac manifestations of primary mitochondrial disorders”. In a lecture that verged more on the clinical side, he spoke on the fact that mitochondrial myopathy and cardiomyopathy are part of a spectrum of heterogenous disorders associated with primary defects of mitochondrial metabolism. This interesting talk was followed by another one by **Dr. Gayathri N** (NIMHANS, Bangalore, India) on “Mitochondrial disorders with novel mutations – a study from tertiary referral centre in South India”. The association of mitochondrial mutations with neural regression/neurodegenerative diseases was discussed, along with the various syndromic and non-syndromic mitochondrial disorders. To round up this session, **Dr. Aruna G** (Indira Gandhi Institute of Child Health, Bangalore, India) spoke on “Biochemical and molecular diagnosis of inherited mitochondrial disorders in children – an overview”. Her talk vested on specific diagnostic procedure for inherited mitochondrial disorders. Prenatal genetic testing and interpretation of test results help in early diagnosis and early treatment initiation.

During the lunch and tea breaks young researchers and students who participated presented scientific poster presentations.

The post-lunch session was chaired by *Dr. Bruce Cohen* and *Dr. K Thangaraj* titled ‘*Mitochondria: Signalling and Metabolism*’, and was started by an energetic **Dr. Suresh Mishra** (University of Manitoba, Winnipeg, Canada) on the topic “Extramitochondrial cell signaling function of a mitochondrial protein prohibition”. He spoke on prohibitin (PHB), a phosphoprotein that inhibits DNA synthesis, thereby playing a critical role in various cellular processes. The mitochondrial prohibitin functions as chaperone and is found to act as ubiquitin. Alterations in this gene expression showed interesting results, which have opened an opportunity for research in treating obesity, a major health concern in many countries. This was followed by a talk on “Role of mitochondrial *STAT3* in redox metabolism” by **Dr. Naresh Babu V Sepuri** (University of Hyderabad, Hyderabad, India). He presented the results of his group’s work on *STAT3*, a transcription factor essential for respiration, which is activated by cytokines, and usually seen in abundance in the inner membrane of the mitochondria. He then proceeded to explain the role of ROS and other modified proteins that help in regulating the expression of *STAT3* in mitochondria. The session was completed by **Dr. Manjunath Joshi** (Manipal University, Manipal, India), who spoke on “Context dependent regulation of *PEPCK* isoform genes by RNA stability and DNA promoter methylation in human cells”. Dr. Joshi explained the functions of *PEPCK*, as well as the importance of the two isoforms *PEPCK-C* and *PEPCK-M*. He spoke about the relative expression and function of *PEPCK* isoforms and effect of genistein on *PEPCK* isoforms. DNA methylation pattern in promoter of *PEPCK* isoforms is different. The end of the day’s hectic scientific proceedings did not deter the members of the SMRM from having deliberations during the General Body Meeting shortly

The evening culminated with a cultural program and dinner.

The **second day** of the conference started with a session on '*Mitochondrial Genetics*' chaired by *Dr. PM Gopinath* and *Dr. K Radhakrishnan*. The first talk was on "Clinical and genetic heterogeneity of mitochondrial disorders: Does the ancestry have any role?" by **Dr. K Thangaraj** (CCMB, Hyderabad, India). He started by listing the importance of the mitochondrial role in almost all systems of the body and the associated disorders due to mitochondrial dysfunctions. He then proceeded to describe the results of his group's study on the various mitochondrial disorders such as LHON, CPEO, MELAS, myopathies etc. The results showed that depending on the population studied the mitochondrial variations altered. His talk was followed by that of **Dr. Mercy M Davidson** (Columbia University, New York, USA) on "Mitochondria mediate genomic instability in cells after targeted cytoplasmic irradiation". Dr. Davidson spoke about the types of radiation exposure we are prone to, and internal exposure (inhaled, ingested and absorbed) being harmful. When experimented by irradiating cultured SAE cells (Small Airway Epithelial cells) with α particle and analyzing its effect on mitochondrial morphometrics, dynamics, fission and fusion, irradiation was found to cause mitochondrial distortion. The next speaker of the session was **Dr. Keshav K Singh** (University of Alabama, Birmingham, USA) on "Mitochondrial Control of Epigenetics and Genetics and its role in Cancer". Dr. Singh spoke on the role of mitochondrial dysfunction in tumorigenesis. Several cancers and mitochondrial DNA depletion syndromes (MDS) have been associated with a decrease in the mitochondrial DNA (mtDNA) content. Moreover, mutations in the nuclear genome, the mitochondrial D-loop and genes encoding for mitochondrial DNA polymerase γ have been found to lead to tumors in cell lines. These mutations deplete mtDNA gradually, eventually facilitating tumorigenesis. Depletion of mtDNA has been known to cause epigenetic changes in the nuclear genome by affecting major pathways thereby contributing to the formation of



tumors. Dr. Singh's work with *Saccharomyces cerevisiae* serves to validate these findings. **Dr. Amutha Bhominathan** (SENS Research Foundation, Mountain View, California, USA) spoke on the topic "Allotopic expression of ATP8 as a strategy to rescue mitochondrial DNA mutation in a ATP8 null cell line". She outlined the possibility of reengineering mitochondrial genes expressed from nucleus as an alternative to overcome mitochondrial defects, using allotopic expression of the ATP8 gene.

The second session titled '*Mitochondrial Biology*' was chaired by *Dr. Mercy Davidson* and *Dr. Rameshchandra Sahoo*. The first talk was on "Establishment of retinal mitoscriptome gene expression signature for diabetic retinopathy using human cadaver eye" by **Dr. Sundaresan Periasamy** (Aravind Eye Hospital, Madurai, India). Mito-scriptome consists of all mitochondrial gene products and nuclear gene mitochondria related products. The talk concentrated on the role of mitochondria in diabetic retinopathy, wherein 3 genes were shown differently regulated and are potential biomarkers for the disease. **Dr. Bruce Cohen** (Ohio, USA) spoke next on "New Therapies in Human Mitochondrial Disease Mitochondrial Biology: From Molecules to Disease". He dwelled on dealing with mitochondrial diseases and the way it is studied in different clinical phases, briefly glimpsed on NINDS database and spoke about the possible applications of drugs such as EPI-743, sistainin and Bendavia.



This was followed by a talk on “Regulation of iron-sulfur cluster biogenesis in mitochondria” by **Dr. Debkumar Pain** (Rutgers University, University of Pennsylvania, USA). A conserved and essential process in a cell, it also serves as a major regulator of cellular iron homeostasis and is relevant for neurodegenerative, hematological and metabolic diseases. His talk gave a detailed insight into the biogenesis of FeS cluster proteins in eukaryotes and their significance in apoptotic and other pathways. The session was rounded up by a talk on “Influence of EBV transformation in mitochondrial function” by **Dr. Sanjiban Chakrabarty** (Manipal University, Manipal, India). He focused on mitochondrial transcriptional factor A (TFAM), a nuclear encoded mitochondrial specific transcription factor, which is responsible for regula-

tion of transcription of several genes in mitochondria. He proposed that the up-regulated copy number of TFAM gene up-regulates its gene expression, which further increases the cellular mitochondrial copy number reducing the oxidative stress in the transformed LCLs.

The last session of the conference was on ‘*Mitochondria: Cell Biology and Proteomics*’ chaired by **Dr. Ullas Kamath** and **Dr. Prabha Adhikari**. **Dr. Rana P Singh** (Jawaharlal Nehru University, New Delhi, India) kicked off the session by talking about “Role of mitochondrial fusion in apoptosis of colorectal cancer cells by butyric acid”. In a very simple and systematic way he presented his work to show the preventive effect of butyric acid, one of the metabolite produced due to anaerobic fermentation by gut microbiome, on world’s third leading cause of death, colorectal cancer. The next speaker was **Dr. Illora Ghosh** (JNU, New Delhi, India) and she spoke on “Assessment of lycopene to combat rotenone and dexamethasone induced mitochondrial dysfunction in human trabecular meshwork”. Her talk focused on the role of mitochondria in glaucoma, especially with regard to ROS. Her group aimed to identify the role of antioxidants in trabecular cell during mitochondrial injury. The last speaker of the session was **Dr. K Satyamoorthy** (Manipal University, Manipal, India) on the topic “Control of Mitochondrial Function in Tumor Cells by the Process of Exocytosis”.

He focused on the DOC2B gene, a tumor suppressor that has been shown to be involved in Ca^{2+} dependent intracellular vesicular traffic, actin remodeling, induction of Anoikis and cell cycle arrest. Studies in his laboratory show that DOC2B knock down in Cal27 (oral cancer cell line) induced cell proliferation and cancer growth. Expression of DOC2B gene reduces AKT, ERK and EMT signaling leading to mitochondrial biogenesis. DOC2B was also shown to downregulate TFAM, PQC1 and NRF1.

That talk brought to close the scientific sessions of the conference. A small valedictory event was held, wherein Dr. K Thangaraj summarized the activities of SMRM as well as that of the conference, and thanked the organizers – School of Life Sciences and Manipal University, in addition to the other sponsors. Awards were given to two young researchers for the best posters, with Dr. Lalji Singh doing the honors. It was also announced that the next Annual SMRM Conference will be held in Madurai, with Dr. P Sundaresan being the convener. With certificates being distributed, high tea being served and delegates planning for their return, the 4th Annual Conference of the SMRM drew to a close.



One Day Symposium On Human Cytogenetics and Genetic Toxicology

December 10, 2014

- Rayees Abamed. B & Vinita Kaulgud, M.Sc Year I

A day-long symposium on 'Human Cytogenetics and Genetic Toxicology' was organized by School of Life Sciences on Dec 10, 2014. It also marked the 75th birthday celebration of Prof. PM Gopinath (Senior scientist, SLS). Dr. P.C. Kesavan, of MS Swaminathan Research Foundation (MSSRF) was the first of the eminent speakers of the day. He mainly focused on genetic toxicology in his talk titled 'Genesis and rise of genetic toxicology in the 20th century: why a decline in recent years?' He began with a brief introduction of genetic toxicology, mutations and the mutation theory and later gave in-depth information about genetic toxicology and formation of environmental mutagen societies and genetic toxicology databank. He also spoke about the methods used to detect the mutations and application of transgenic animals in genetic toxicology. He also shared the information about various compounds which lead to toxicity. Dr. Friedrich J. Otto, Muenster, Germany, was the second eminent speaker of the day and he spoke about 'Prognostic Relevance of Ploidy and Cytogenetic Variability'. His work was primarily about the human malignant tumor and understanding their prognostic relevance and the cytogenetic variability. He presented his results obtained by various experiments such as Kohler's illumination technique and using different fluorescence techniques to assess the prognostic level of malignant tumors. He also explained the aneuploidy and diploid state of primary melanoma to show the cytogenetic variability of malignant tumors. His talk gave a broad idea and knowledge for future research.



Dr. S. T. Santhiya, Dr. ALM Post Graduate Institute of Basic Medical Sciences, Taramani, Chennai, was the next speaker and her topic for the day was 'Chromosomal and molecular characterization of patients with amenorrhea and recurrent pregnancy loss'. She described amenorrhea, its classification and its connection with the pregnancy loss. She presented data from many cases and the results she had obtained. She gave information about the different techniques used in determination of the disorders. Dr. K. Thangaraj, Centre for Cell and Molecular Biology, Hyderabad, spoke next on 'High throughput analysis revealed novel genes for male infertility', wherein he spoke of male infertility and its associated genetic factors. He gave reasons such as genetic factors, chromosomal abnormalities, micro and macro deletions, mutation in X chromosomes, mutations in autosomes and mutations in mitogens which may have an effect in the male infertility. He described the applications of gene expression analysis and exome sequencing in this regard. The next speaker was Dr. Suresh Abraham Jawaharlal Nehru (JNU). In his talk titled 'Role of anthocyanins and resveratrol as protective agents against genotoxic damage', he started by giving an introduction about genotoxicity, anthocyanins and resveratrol. He presented his data and results which reveal that food containing anthocyanins and resveratrol protect against genotoxic damage. He also presented a combined data of ad-

-tion of anthocyanins and resveratrol together and their results. Dr. Chandra Samuel, University of Madras, Chennai, who spoke about 'Visualizing Human Chromosomes through Molecular Cytogenetic Techniques' was the last speaker of second session of the symposium. She presented a wonderful timeline about the molecular techniques applied in the field of cytogenetics to visualize the human chromosomes. Her talk was very helpful to students providing an overview of the techniques available in genetics. She elaborated on different banding techniques namely G, C, R, RFA bandings and fluorescent methods such as FISH, Combinatorial Labeling, Multiplex FISH and Spectral Karyotyping (SKY), which are the robust cytogenetic techniques available nowadays. In addition, she also discussed results experiments on patients using array CGH method to analyze the human chromosomes and to distinguish the genetic disorders in the karyotype.



Dr. N.B. Ramachandra, Mysore University, Mysore talked about 'Genetic Analysis of Dyslexia', describing it as a common learning disability disorder seen in children. The importance of this disease was well covered by Dr. N.B. Ramachandra, who was the first speaker of third session of the day. He gave a brief description about the disease and explained how to identify this disease phenotypically in a child. He also described chromosomal analysis and its linkage to nine loci in chromosomes 1,2,3,4,11,17 and 19. He added the different diagnosis methods available to encounter this disease such as Ruller's Proforma A & B, WRAT spelling subtest etc., Dr. Ramachandra discussed his work related to dyslexia among Indian population. The

study revealed the copy number variations, duplications and deletions in six genes particularly on PCDH11X in Xq21.3 region. Moreover, his lecture also covered the significance of dendritic spiral plasticity and its role in learning disability. The second talk of the last session, given by Dr. K. Premkumar Bharathidasan University, Tiruchirappalli, Tamil Nadu, focused on 'Anticancer Agents and Genotoxicity – Tipping Balance between Cellular Suicide and Survival' where he elaborated on nano-medicine and its application cancer treatment. He described the different classes of toxic effects and its relation to genotoxicity of cancer. In his research work, he used different diagnostic techniques such as Field Inversion Gel Electrophoresis (FIGE) and LM-PCR to prove the genomic instability in cancer. He further elaborated the application of nanoparticles and its importance to produce anticancer agents. His unique presentation, with pictorial representations to deliver the basic concepts of cancer, attracted the students.

Dr. Raju Murugesan, University of Missouri, Columbia, the last speaker of the one-day symposium talked about 'Chaperone Peptide Modulates Stability and Function of Cataract Causing α AG98R – Crystalline' and explained the molecular chaperons and its interaction with the cataract causing protein – crystalline, to explain how it modulates its function was given by the professor. He studied the key mutation in α AG98R protein, which is more sensitive to temperature and showed the results that found a 19 amino acids chaperone peptide (DFVIFLDVKHPSDEDLTVK) and its high potential for therapeutic application in the field of medical science.

Flow Cytometry and Genetic Toxicology Workshop School of Life Sciences, Manipal

December 11-16, 2014

- Dr.T.G.Vasudevan, Assistant Professor, SLS, MU

A five day workshop on 'Flow Cytometry and Genetic Toxicology' was inaugurated at School of Life Sciences, Manipal on December 11, 2014 by Dr. GK Prabhu (Registrar, Manipal University) and renowned cytogeneticist Dr. Friedrich Otto (Munster, Germany). The workshop is organized by the School of Life Sciences (SLS), Manipal University.

Inaugurating the workshop at SLS, Dr. Prabhu spoke of the insights that one gains by organizing and participating in such workshops and training programs. He noted that everyone on either side benefits from such programs, which help in developing the knowledge and enables one to be aware of the latest trends in the areas of interest. He also reiterated the principle of the Manipal University to continue promoting such events to bring about interactions between researchers, students and faculty members from different parts of the country and also to share the knowledge and expertise. Dr. Otto, an expert in the field of cytogenetics, gave a brief introduction to the type of work carried out in his laboratory. Later in the day, he interacted with the participants of the workshop. Earlier Dr. BS Satish Rao (Head, Division of Radiobiology and Toxicology, SLS) welcomed the gathering. Dr. KP Guruprasad (Head, Ageing Research Unit, SLS) delivered the vote of thanks. Around 30 participants, including faculty members, students and research scholars from different parts of Karnataka took part in the workshop and gained knowledge and experience in the nuances of flow cytometry and its varied applications in this field, as they were exposed to lectures, tutorials and hands-on training on the basics of flow cytometry, its applications in genetic toxicology and current trends. The workshop concluded on December 16, 2014 with a lecture by Dr. H Krishnamurthy (NCBS, Bengaluru) and certificate distribution.



Student Council Events

CONTINERE: 'The Cultural Week'

- Pallavi Mathur, M.Sc Year I

CONTINERE – The cultural week, organized by the SLS student council was held from 14th to 20th January, 2015. During the course of these seven days, several events were held in School of Life Sciences. Each day of '**Continere**' had a specific dressing theme, like- 'back in time', 'baby's day out', 'let's get desi', 'twin it!'; this was enthusiastically followed by all the students. Events held during '**Continere**' were:

1. JAM (Just A Minute)
2. Collage - Participants made collage on "Is Humanity At The Precipice?"
3. Rangoli
4. Singing competition- included categories like: Eastern/Western group/solo singing
5. Poetry writing- participants wrote Hindi and English poetry on the topic "Monsoon in Manipal"
6. Debate – Held on topic "Animal ethics" and "Globalization in education"
7. Sketching and Painting - Participants made sketched and paintings on the topic "My GMO world"
8. Cartooning – topic for cartooning was "Life on Mars"
9. Dancing competition - included categories like: Eastern/Classical/Western solo and Eastern group dancing
10. Mad Ads - Participating groups were given "wheel chair" and "wax" as the items to prepare their Mad Ads on
11. Instrumental - included group and solo categories
12. Face painting
13. Antakshiri
14. Photography - whole daylong event, participants were given the topic "evolution" for their photographs
15. Potpourri - this event was a combination of three games which were played by all the participating teams

Bachelors and Masters students actively participated in all the events which gave them an opportunity to showcase their talent. Many new talents were also discovered. The batches (BSc and MSc) were awarded points according to the winners of each event. All the events were judged by the faculty members of School of Life Sciences.

A special event was organized for the faculty and the research scholars of SLS. This event was held on 21st January, 2015. Many teams of faculty members and research scholars participated to play antakshiri and potpourri making the whole event memorable and successful.

At the end of 'Continere', MSc 1st year held first position followed by BSc 3rd year in the second position and BSc 1st year in the third position.

Visit to an Orphanage

- Janith Maben, M.Sc Year I

The social committee of the School of Life Sciences had organized for a visit to an orphanage “Vishwasada Mane” during the Christmas season. The organization has many units. It has a rehabilitation center, orphanage and an old age home. The organizer and his wife were living with the children, taking care of every bit of the organization. In the orphanage there are about fifty children, from little babies to boys and girls of 13 to 15 years. All the kids go to school. We interacted with the kids and played with them. Few children sang songs for us. We had taken clothes, books, pens and few eatables for the children. We had a great time with the children and it gave us immense satisfaction seeing them happy. It was a day well spent. As Erasmus said, “There is no joy in possession without sharing”, so share, care and spread happiness.



Upcoming Events

- ◆ National Science Day - February 28, 2015
- ◆ Sports Week - March, 2015 (first week)
- ◆ UTSAV - Manipal University Cultural Event - April 6 to 10, 2015

Interviews

Dr. P. Gopinath, School of Life Sciences, Manipal University

Student Council (SC): Sir, to begin with, what made you, having a basic degree in Botany, to venture into the field of Human Genetics?

Prof. Gopinath (PMG): After completing my Master's in Science degree in Botany at Karnatak University, (Dharwad) and doing my PhD in Plant Cytogenetics at the Indian Institute of Science (Bengaluru), I was working at the Department of Basic Sciences of Kasturba Medical College (KMC), Manipal. Our Head of Department, Prof. H.Shantaram, and the then Dean of KMC, Prof. A. Krishna Rao, wanted me to take up research activity. Prof. Krishna Rao advised me to take up human genetics. He also helped me immensely to understand the various techniques associated with human genetics by encouraging and sending me to the Post Graduate Institute of Medical Education and Research (Chandigarh), to have basic training in the field. I had applied for Post-doctoral Fellowship of Alexander von Humboldt Foundation (Germany), and fortunately, I was selected to work at the Institute of Human Genetics (Frankfurt). I worked with Prof. K.H. Degenhardt, one of the pioneers in the field of Human Genetics in Germany. I was with him for two years, and that helped me to get into the field of Human Genetics.



SC: Working in so many laboratories around the country, (is there) any lab you are particularly fond of or have great memories associated with?

PMG: I should mention the laboratory facilities available at Indian Institute of Science (Bengaluru), as the best and then come the facilities at AIIMS (New Delhi) and at PGIMER (Chandigarh). I find now that the facilities at our centre at SLS, Manipal University are fantastic.

SC: How do you compare the various international laboratories you had worked?

PMG: When you talk of international laboratories, I had worked mostly in Germany, except for a short period at the University of Leiden (Leiden, The Netherlands). In Germany, in addition to the laboratory at Frankfurt, I had worked at the Institute for Toxicology (Schmallenberg) with Dr. F.J.Otto, at the Institute for Human Genetics (Halle) with Prof. I. Hansmann, and at the Institute for Mammalian Genetics (Neuherberg) with Prof. Udo Ehling and Prof. J.Graw. All these laboratories provided very good facilities.

SC: Do you think science as a field today offers, fair and equal opportunities to female students?

PMG: Certainly, yes. If I take my own case, when I was a student of M.Sc. degree course at Karnatak University, Dharwad, of the six seats for the course, the university had admitted three male and three female students, and two male students left the course, leaving one male and three female students in Biology. Even today, I find that not only opportunities are fairly distributed, but sometimes over representation. This trend should continue and we should advocate equal opportunities for men and women.

SC: What is the scope of pursuing research in the field of human genetics today?

PMG: Fantastic. If you had asked me the question a few decades back, of the incidence of human genetic diseases in the population, the answer would have been 5%, but today the answer would be entirely different, and may be 95%. Decades back, we were aware of Down syndrome, hemoglobinopathies and a few others, but today, we know that even infectious diseases have genetic basis, that is, some individuals are sensitive and others are resistant to infection. Thus human genetics, or in other words, its extension medical genetics, is playing an important role. Earlier, we had very few institutions offering courses in human genetics, namely (those in) Amritsar, Mumbai, Hyderabad, New Delhi, Patiala and a few others. Now, we have opportunities available at a large number of centres, such as the University of Madras at Taramani – which was due to the efforts of Prof. Marimuthu, my respected mentor – and also our own Manipal University. We should be happy that the Director of our School is the Vice-President of the Indian Society of Human Genetics (ISHG), thus actively associated with human genetics activities in the country.

SC: What is the scientific temperament that our generation of researchers must develop?

PMG: Basic understanding of the field of specialization is a must for any researcher. Having a very strong foundation in his/her field will help the researcher to build a concrete structure, and s/he will be able to confidently face any difficult situation.

SC: Considering your enormous experience and comparing the past and the present, what do you feel has changed in the science research arena?

PMG: There has been tremendous progress in the science research arena. Take for example, decades back when we were doctoral students, we did not have the facilities, such as photocopiers or internet. Just imagine a situation, wherein you have to copy down an article from a journal in the library, to be shown to your guide, a laborious process indeed, which is now possible, by a click, so simple. Think of the laboratory facilities available now; decades back, to have a chromosomal preparation from blood cells, and their analysis, we had to resort to laborious and time consuming procedures. Progress in technology has now made it possible to have the preparation in a very short time, and also to analyse, and using the FISH procedure to have data on micro deletions in chromosomes. The sequencing setup now permits large scale genome analysis in a matter of hours.

SC: What drives you as a scientist in your profession life as well your personal life?

PMG: My drive comes from my doctoral guide, Dr. M.K. Subramaniam, who had the temperament. He made sure that his students are trained well to face any academic problems. Any discrepancy was not tolerated by him, and we were unceremoniously berated for it. He was one of the pioneers in cell biology, having worked on Golgi apparatus in animal cells, and was an expert in the field of cell biology. His struggle to face criticisms in academic life, and his attempts to overcome these hurdles, inspired his students, including me. In my personal life, I had the support from my colleagues, and my family, consisting of my wife, daughter and granddaughters drive me forward.

SC: How do you balance your profession and personal life?

PMG: Lots of planning and the help of my Chief, my colleagues and my family. Now, having crossed 75 years of my life, lead an academic life at a low profile. (*smiles*)

SC: Which phase of your life or institutes you have worked in, house the memories that you most reminisce about?

PMG: My postdoctoral years, during 1974-1976, are a favourite. I was working at The Institute for Human Genetics, Frankfurt, Germany, under the supervision of Prof. K.H. Degenhardt, a pioneer in the field, in Germany. One of the soft-spoken people I knew, it was a pleasure to be with him, and every day was a new lesson for me, and I should say, was the best part of my life.

SC: What do you hope that the School of Life Sciences, Manipal University as an institution can do to contribute more to the society?

PMG: Our School of Life Sciences, Manipal University has been able to establish itself as a centre in the area of education, research and in diagnostics. We have the capability to explore various other life science related activities, for example, nutrition and food science and technology. I wish that School of Life Sciences will be a leader in the country.

Dr. Lalji Singh, CCMB, Hyderabad

Dr. Lalji Singh is (almost) a house-hold name in the world of life sciences. He was the Director of Centre for Cellular and Molecular Biology (CCMB) in Hyderabad and recently retired as the Vice-Chancellor of Banaras Hindu University, Varanasi. He contributed as an administrator to the large scale improvement in research and infrastructure at CCMB as well as in BHU. His scientific contributions can be seen from the hundreds of peer-reviewed papers authored by him. He was the venerable choice for being the chief guest at the 4th Annual conference of the Society for Mitochondrial Research in Medicine, organized by the School of Life Sciences, Manipal University. On the sidelines of the two day conference, Dr. Lalji Singh gracefully accepted our request for a short interview and spoke to the Editorial Board of the Students Council.



Dr. Singh emphasized the need for proper diagnosis of the mitochondrial diseases. In this regard, he proposed conducting an exclusive workshop on development of effective diagnostic methods and techniques, by involving not only the scientific community of researchers but also clinicians. He compared the role of the nuclear genome to that of the central government and the role of the mitochondrial genome to that of the state government, thus indicating the enormous influence of the nuclear genome over the mitochondrial genome. Dr. Singh hoped that current researchers would pursue their area of interest with diligence and with an open mind to accept that there is always something (new) to be acquainted with and to explore. He wished that the present generation focused its inclination of research towards upcoming areas like neurodegenerative disorders, gene therapy etc. Talking about the advantages that the current crop of students have (over the previous generations), he cautioned that the information freely available on the internet must be utilized in the right way and for the right purposes. He also had a couple of good things to say about the Manipal University, while also expressing his gratitude and efficiency with which the conference was conducted, and sending his well wishes to Dr. K Satyamoorthy (Director, SLS), the faculty and the students of SLS.

Dr. K. Thangaraj, CCMB, Hyderabad

Dr. K Thangaraj (Director, CCMB Hyderabad), was in Manipal during the Annual Conference of Society for Mitochondrial Research and Medicine. Several scientists and researchers listened to and interacted with each other in the exciting area of mitochondria and disease. The Editorial Board of the Student Council, SLS managed to record some of the thoughts of Dr. K Thangaraj. Here are the excerpts from his discussion with the Editorial Board members.



On Mitochondria:

It is a 'dynamic organelle' that can be used for several applications, especially when it comes to mitochondrial variations, its dysfunctions and the association with specific diseases. Not only can these variations and dysfunctions help in understanding the cellular and molecular bases of many diseases, but can also assist in tracing human origins as well. Since mitochondria are inherited uniparentally, i.e. from the mother, it has been used in tracing the oldest tribal population in India. They are found among the Andaman tribal populace. This is one of the most unique applications of mitochondria – in population genetics – and has helped in establishing relationships between various ethnic groups and phenotypic variations.

On other applications of mitochondrial research:

Mitochondria have been found useful in cases of organ transplant, which requires the donor and the recipient to be biologically same/identical, to donate the organ. To establish the biological identity between the two, nuclear genome markers such as STRs or Y-chromosome markers are being used. But when it comes to establishing relationship between a grandmother and daughters etc. mitochondrial markers become essential, as one cannot go for conventional markers. The mitochondrial analysis rescues the case, wherein by merely sequencing the hyper variable region in the mitochondrial DNA one can establish a relationship and thus, can be used to save several lives and relationships when needed.

Mitochondria have also been successful in tracing the origins of old bones, hair or teeth samples. This is because of the small genome size (16.5 kb) and the high copy number of the mitochondria per cell. One can isolate mitochondrial DNA from ancient samples and amplify specific regions more easily than the nuclear DNA, which has only two copies per cell, compared to the 100 or so copies per cell of mitochondria DNA.

On the ambiguity in genetic variations among ethnic groups:

It has to be stressed that the human race originated in Africa and then started to spread to various parts of the globe. From the research carried out by mitochondrial sequencing and analysis, most of the South Indian population, which exists today, is related to the African population. Several mitochondrial markers exist and have helped in finding the origins of different ethnic groups that exist in India. Since India was invaded by different civilizations (and populations) over the years, variations started accumulating in these groups, which eventually resulted in the differences that we see today in the various Indian populations.

Dr. K Thangaraj also thanked the organizers and the hosts of the conference.

Dr. Josef Finsterer, Danube University Krems, Austria

Dr. Josef Finsterer is Professor & Doctor at Department for Clinical Neurosciences and Preventive Medicine, Danube University Krems in Austria. He was one of the speakers during the 4th Annual Conference of the Society of Mitochondrial Research in Medicine during December 2014. In spite of his busy schedule, he took some time off to talk to Aarushi Jain of the Student Council. Some excerpts:

Aarushi Jain: What is the future of mitochondrial research according to you? Considering the escalating association of diseases to genetics, epigenetics and environmental factors. Where does this mitochondrial genome effect on various diseases fit in?

Josef Finsterer: Future aspects will not only rely on basic research but also on application to clinical aspect. I mean we are dealing with patients and we are dealing with disorders so we want to find some remedies. So what is really necessary in the application in the daily routine is to find, first of all, the best way of managing these patients. And managing does not only mean how to treat them but also how to diagnose the disorders and also to advise these patients how to behave with the disease, how to communicate it, how to integrate themselves not only into the families with their features but also integrate in a community with patients.

So they need to come under a patient group - that is important as well. I mean this is just the clinical aspect, of course there is also the research impact and this is in another column of future perspective which we have to reinforce and which we have to support with money, intelligence, and logistics and with power. The ideas of the young generation mainly, so it's YOU!"

JF: Cardiomyopathy is a clinical feature. Animals have cardiomyopathies, humans have cardiomyopathies, so whenever you have an animal or a patient with mitochondrial disorder, think of cardiomyopathy! Every patient can have it, disregarding the genetic background. We know that there is such a huge heterogeneity in the clinical features, in the genetic features, so always keep in mind this heterogeneity and believe that every patient, every animal can have everything. But let's hope that they don't have it.

AJ: What should be the temperament for the budding scientists out there?

JF: One of the main features is to find out a basic therapeutic axis to the disease. What we are doing now at the moment is just giving secondary support. There is no therapy which is based on caution. What we need is a genetic therapy, so one major approach for science in the future is to find an axis for genetic therapy. Even though there are a lot of axes, we still are on the way reaching the main goal.

AJ: What is the tactical advantage that today's generation has that was missing a couple of years/decades ago in the field of research?

JF: There is more wisdom accumulating with every scientific paper being published, with every study coming up. We increase our vision and we also increase the possibility to have our own visions so this is just what has been said in the concluding remarks of the conference as well that there's a lot of information out there, but at the same time this information stimulates everyone to think, and be open to such stimuli.

AJ: Was this your first visit to Manipal?

JF: Yes it is my first visit and it's a fantastic place. The people are very friendly and open minded as well. (smiles)

AJ: How was your experience at the 4th Annual SMRM conference and at Manipal University?

JF: The feedback is that the standard of scientific outcome and the findings presented is really high. It is of international standard and I think it is a very good basis, not only for Indian science but for worldwide science as well.

Dr. Freidrich Otto, Germany

In an interview conducted by student council Dr. Freidrich Otto spoke about genotoxicity and its effects. His views were quite clear and simple to the questions arising in the students mind. He co-related genotoxicity to life style one follows and also to what environment he/she is exposed to (radiation, pollution, food etc.). Dr Otto also presented the fact that the toxicity which has accumulated over the years cannot be reduced within a day, however health consciousness can help in further increasing toxicity. On being asked about whether genetically modified crops are beneficial or harmful he said that development is always associated with two facets one is good and the other is bad it depends on the user



which one to choose. The genetically modified foods are advantageous till a particular intake, excessive intake can sometime lead to accumulation and genotoxicity. Dr. Otto believes in involving the futuristic laboratory equipments in the academia but also stressed the point that learning should always start with the basic manual techniques.

Dr. A.J.S. Bhanwer

Dr. A.J.S BHANWER (GNDU, Amritsar, Punjab) – Spoke to the Student's Council recently. Dr. Bhanwer supported the idea of post graduate students pursuing PhD as it provides proper experience and exposure. Pursuing PhD provides a type of job experience of sorts as most of the institutes provide stipends and also great lab experience which will help one in industry as well as academia. Speaking about research in genomics and drug response studies he also mentioned the difficulties that arise in studying such aspects especially in India, with its many caste differences which renders availing of patients from the same group, hard to recruit. The results of the study of effects may vary if such differences are not taken into account, which makes the work even more challenging and interesting. He also spoke about the opportunities for students apart from academics in diagnostic and pharmaceutical industries and R&D departments of various institutions. Although students are fascinated with the possible exposure abroad in field of life sciences, the present scenario in India promotes more research opportunities. The yester year problems regarding funding research have now been tackled by various private institutions and also collaborations with government bodies. He was in Manipal as the external evaluator of PhD defense of a researcher of SLS. His view on the viva was that it was one of the best in terms of participation he has attended.

Fun & Games

Poetry

Out and about I was,
Minding my own business,
When I saw these queer creatures,
Faces reflecting distress.

A scream I heard,
And one too many gasps;
As I ran away,
Some jumped into their cars.

Puzzled I was,
It made no sense to me.
What these beings were,
Maybe another mistake of the almighty.

As dawn passed,
The witch-hunt began.
Every bit of foliage,
They began to scan.

These animals were weak;
Laughable was their defense;
But smart they were
Using number as strength.

I realized I was trapped,
But armed with agility and speed.
I circled the premises,
And drew a lot of squeals.

The numbers grew,
And some tools materialized;
I fathomed this was an unruly lot,
Dominating anywhere it colonized.

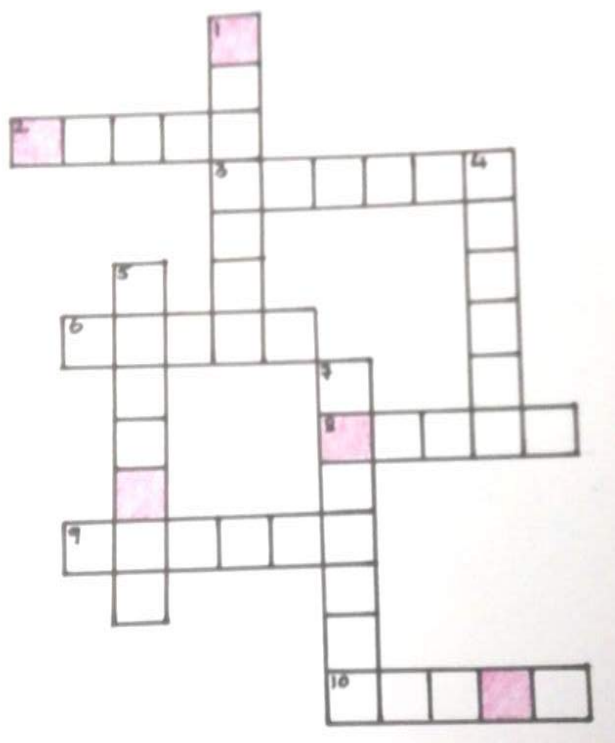
Defense was my principle,
 Unless they got too close.
 But these clever buggers,
 Were no welcoming hosts.

Soon I was imprisoned,
 As I had given up the fight.
 Suddenly a lot of paws drew
 And I was flooded in flashing lights.
 One nasty fellow drew close and asked me:
 Oye, Leopard- Where did you come from?

I roared back and asked:
 Oh Human! Where did you come from?
 - *Shruti Iyer*

Crossword

- *Kruthi Rao*



Clues:

Across:

- 2. Mediterranean Island (5)
- 3. Computer Screen Location Finder (6)
- 6. Opening Passage (5)
- 8. Vast Mountain Range (5)
- 9. Long Japanese Robe (6)
- 10. Of them (5)

Down:

- 1. School Master (7)
- 4. System of Rule (6)
- 5. Obtain through Bequest (7)
- 7. Blade Fixed to a rifle (7)

Answers: Across - 2. MALTA, 3. CURSOR, 6. INTRO, 8. ANDES, 9. KIMONO, 10. THEIR'S, Down - 1. TEACHER, 4. REGIME, 5. INHERIT, 7. BAYONET

Answers:

Alumni Talk

- Advait Subramaniam

To Infinity and Beyond ...

(Or the ramblings of a self-obsessed sod who misses the past and dreads the future)

Disclaimer: Everything I've written here is *'in my opinion'* and if I offend some *holier than thou* souls who read this – my email address is at the bottom of the page and you can spam me all you want.

To be really frank, it hasn't been that long since I graduated from Manipal. This piece hence will not resonate with reminiscing phrases like *'it used to be so much better'* or *'we had it tougher'* or even the age old refrain *'things must have changed ever since...'*

The simple truth is that nothing is as different right now than probably two years ago (*which you'll realize if you read till the end of course, if not thanks for looking at the pretty pictures*) – probably the personnel who visit the hallowed halls of MLSC are different, maybe *all* the rooms now are air-conditioned with new tables and chairs, possibly the names of restaurants that surround it have been rejiggered to sound more *chic*, but Manipal as a **culture** has been and pretty much will be the same for years to come.

So why the hell am I writing this you ask? The simple answer is I was asked to (I'm scratching my head the same way you are as to why?). The one thing I can offer is perspective. Let me try and give you mine.

I arrived at Manipal in the summer of 2007 - all of 17 years, a Tam-Brahm who hadn't even remotely experienced what mother-in-law's in Indian soap operas (if they were *Star Wars* fans) would like to define as *'the dark side of the force'*. I had my reservations, but was hopped up on the *'promise of biotechnology'* by my teachers at school and so gleefully played to their tunes, ending up starting my bachelors (and eventually culminating with my Masters) in biotechnology. I don't regret it though, not one bit.

I had a senior from school studying at MIT and there's a word of advice he let out that stayed with me through all my years of college life and beyond. He said – 'Manipal is a place where you can be the best you can be or the worst you can be, the choice is yours'. It's a simple but effective concept that drives home an important ideal – the realization that Manipal is a place of free will, of the choices **you** make, a student town surviving on a student economy.

The first year of college was my most exciting one. We had a good group of seniors who had their fair share of fun taking us through the ringer (all kosher though); but it built a sense of comfort that stayed with us for the rest of our time together at college. Our batch was lucky because the student council started a lot of stuff during my first year that still continues till today (I hope...) – We had the first Prakaya, the first College Magazine, the setting up of the Ed Board Wall close to the exit doors and if memory serves me right, we even finished among the top 7 colleges in Utsav (I think it was our highest finish yet, at least till I graduated). Our extra-curricular sphere was spinning at top speed and truthfully it was never as good as it was in the first year, although most of the *tajurba* we gained kept us in good stead for our next four.

Our batch, like all others, had its share of hook-ups, break-ups, controversies and camaraderie... but of the normal kind and not what Karan Johar believes happens at universities. The 'gang' I was part of was a group

of three and our *South Indianess* coloured our frequent hangouts – Andhra Mess, Nehru Canteen, Manipal Canteen and breakfast/tea at Pangal. Movies were another past-time we shared and we would usually watch any Tamil/Telugu movie (and the occasional Hindi one) that released at Udupi's famous theatres – Aashirwad or Diana (those bus rides were fun).

We ventured into the '*dark side*' only late into our Manipal lives, but what fun we had during our years as post-graduates. Dee Tee, Bacchus, Big Boss, Manohar, Cocks and Mocks or Jewel Rock – I think you guys know what I mean. They were some legendary sessions. But all of us came out unscathed (bar a few scars here and there), passed our exams with caffeine hangovers and got our degrees.

Most of us went into careers in science – PhD's, Industry positions, teaching and are doing pretty well. It's a tough business though – a scientific career. One word of advice – if you're in it for the money I suggest you change your career path.

Manipal gave us a lot of things – professional experience, confidence, life lessons and personal bonds that hopefully will stand the test of time. It also took a lot from us – our childhood innocence, our perception of life in general at the time of starting college and the idea that a college education equals a concrete bungalow and three BMWs. It moulded our moral compass and gave us that push we all need – the rest is up to us I guess – to either fly higher or fall flat!

I'll finish off with explaining the title of this drivel. *To infinity and beyond* ... Buzz Lightyear's catchphrase (hence the self-obsession quip ... smart no?) It's an apt description of our lives through college – we're always hoping there's a bright future ahead (and dread it at some level). The catch-phrase in itself was adapted by the creators of Toy Story from Stanley Kubricks epic *2001: A Space Odyssey*; An example of inspiration – what we look for from the past.

To infinity and beyond...





© Sagnik, *B.Sc Biotechnology Year II*



© Subemarekha, *B.Sc Biotechnology Year I*

Our sincere gratitude extends to...

Sincere thanks to: Prof. K. Satyamoorthy, Director, School of Life Sciences , Manipal

Our Faculty Advisers: Dr. T.G. Vasudevan, Dr. Saadi Abdul Vahab, Dr. Vidhu Sankar Babu

Cover Page Design: Rayees Ahamed., M.Sc Year I

Cover Photo Credit: Mahesh Nair, M.Sc Year I

Student Editors: Namrata Iyengar, Poorva Huilgol, Rayees Ahamed

Interview Credits to: Aarushi Jain, Pranoy Sahu, Vani Patel, Namrata Iyengar & Poorval Huilgol

©SLS Student Council