

# PROBE

The Next Generation Explorer  
Volume 3 | Issue 3 | 2014



EBOLA  
ALERT!

*know what you need to know..*

# Contents

Unsung Hero: Kailash Satyarthi

2

"My Vision of Pharmacy Profession in India"

3

**Encephalitis Lethargica:**  
When the World Fell Asleep

4-5

*Everything on  
Off-Campus Thesis*

6

*Are you ready to get placed?*

7

*ALL YOU NEED TO KNOW ABOUT  
EBOLA*

8-9

*5000 years in Ancient INDIA*

10-11

**Interview: Dr. Shrikant Viswanada**  
Plants in Drug Discovery

12-13

*Atmos'14 : the National Annual Technical Festival*

14

The Importance of Being **Vaccinated**

15

*Conference Alert*

16

Poems' Corner | Achievements

17

This bimonthly magazine is published by Department of Pharmacy, BITS-Pilani, Hyderabad Campus. The primary aim of this magazine is to highlight recent updates in life-science research, specially in the field of Pharmacy. Also this magazine serves as a common platform to share the ongoing research, achievements, events and future opportunities useful for the young researchers.

Please address your comments, feedback and questions to: Sumeet Chawla, Editor, PROBE Magazine, Department of Pharmacy, BITS-Pilani, Hyderabad Campus. R.R. Distt, Jawahar Nagar. Secunderabad (Telangana), INDIA-500 078. email: probemagazinebitsh@gmail.com



# Two years of



Two years ago, the PROBE magazine was released after a far-sighted conceptualization. Two years later, PROBE can be looked upon as a plan well executed. Launched as Pharmacy Research schOLars Bimonthly Epistle, the term 'Probe' means to explore or examine something. Yes, PROBE has always explored and examined the activities of the department and served as a platform for research scholars to share their achievements and merits, doing enough justice to its establishment.

Down the lane it embraced and engulfed 'Pharmabuzz', the Pharmacy association newsletter adding meaning to its existence.

Brainchild of Mr. Ram Kumar Mishra, ex-Editor PROBE reached heights of popularity and brilliance. Under his parasol of care, the release of PROBE is now the most awaited event in the department. After the last issue, I was given the responsibility of taking care of PROBE. I still remember what he said to me, "Take care of my daughter, She is yours now." I accepted the responsibility with gusto and zeal.

I started as a coverpage designer, was promoted to the typesetter and here I am, writing my First Editorial!

I am nothing but a third year B.pharm (Hons.) student with some interest in designing and a desire to do bring a change. A change for the betterment.

Doesn't matter if it's too small to be noticed, I am yearning for a change.

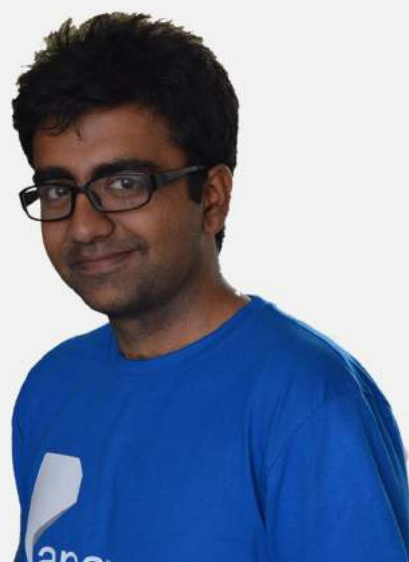
Taking small steps, Team PROBE has now reinvigorated the design, content and hence the quality of the magazine.

Nobody is perfect, they say. There is always a scope for improvement and for a magazine like PROBE, the readers' feedback and comments inspire the team to work smarter and come up with something to educate you, inspire you and help you perform better in life.

We have added some new sections to the existing sections to fulfil our readers' requirements. Hope you like them. We would like to hear from you at [probemagazinebitsh@gmail.com](mailto:probemagazinebitsh@gmail.com). Together we will strive to make PROBE everyone's favorite.

Happy Reading!

*Sumeet Chawla*  
Editor





# unsung HERO

God uses ordinary people to make a difference.



**-Venkat Koushik, Research Scholar**

Recently we hear a new name called Kailash Satyarthi in media circles, I guess most of us don't know who he is until he became a Nobel laureate. We are more familiar with the names like Kailash kher (singer) but not the social activist Kailash satyarthi. It is surprise to know that he is working to free the children from slavery across 140 countries throughout the world. I guess the real heroes does not need to advertise their work, rather the result of their work explain the real compassion. People would be wondering how can the guy who work for children would get a Nobel Peace prize, but the real truth is that today's children are tomorrow citizens. If today's children have their childhood with proper education and skills, then tomorrow's world will be peaceful. World population is in the clutches of various desires. But there is certain section of world with no real desires; they work hard for their masters to which they earn meager money. To full fill their needs they took debts from masters and later they will lend their kids to work. These kids were thrown into rough and hazardous environments to work. There is no safety for their health and lives. They were treated as objects and hence they lose their childhood and also the valuable future. These horrific situations opened a new chapter in a 26 years', gave up lacerative carrier as engineer and started 'Bachpan Bachao Andolan'. When asked how the spirit of compassion arises, he humbly states with smile that shines seen in the eyes of kids who were brought out of bonded slavery gives him a kick of satisfaction. Mr. Satyarthi, who has freed 80,000 kids who dreamt of pleasant tomorrow was never known to public. This heroic feat, which was not achieved by anyone else because of which Nobel prize has embraced him. Behind such a feat there

were many memories, some of which bring tears and some of which bring smiles. When he tried to free Nepal kids working in a circus, organizers attacked him with iron rods. Though the flesh in his body got injured, the compassion in his heart never did. In another adventure he came across kids who had never seen a banana in entire life. Those kids were thinking that it was a potato, when asked to eat they started eating along with the peel. During his journey of 24 years he lost many things including two of his colleagues. But he says that he will forget all the sorrows in his journey when those kids smile and fly with colorful wings of freedom.

People like Kailash Satyarthi neither cared for fame, nor care for awards. He only cared for his compassion to free the kids from bonded labor. Whenever people do their duties with heart, the awards or appreciations will reach them. He still believes that Nobel prize will not alter his desire or his life style, but made this social evil aware to many common people like us. I take this opportunity to appreciate work of Kailash Satyarthi and I wish he inspire many more people.

## **About Kailash:**

Kailash Satyarthi born on 11<sup>th</sup> January 1954 is an Indian children's rights advocate and an activist against child labour. As a founder of 'Bachpan Bachao Andolan' in 1980, he has acted to protect the rights of more than 83,000 children from 144 countries. It is largely because of Satyarthi's work and activism that the International Labour Organization adopted Convention No. 182 on the worst forms of child labour, which is now a principal guideline for governments around the world.





# "My Vision of Pharmacy Profession in India "

**-Piyush Bafna M.Pharm(2<sup>nd</sup> Year)**

**My vision** of Pharmacy profession in India lies in one sentence- "Equal opportunity to Every-one"

Pharmacist can think about the emerging field of healthcare system like- Medication Therapy Management (MTM) which is relatively new branch, deals with clinical services that pharmacists can provide for their patients. The result is a reconciliation of medication and patient education resulting in increased patient health outcomes and decreased costs to the health care system.

Comprehensive home medicine review system is another good approach. Including "pharmacist home visits" in which pharmacists make house calls and are paid through the government health care system.

We can also think of providing certain disease state programs such as smoking cessation, weight control, health awareness, and be paid for these services under the government national health system.

In most of European and American countries, pharmacist only prescribes and dispense the medication, but in India the case is different. Here the Physician will only prescribe the medicine and pharmacist only dispense medicines. So we should get equal opportunity as that of physicians.

We should more focus on the courses like Doctor of Pharmacy (Pharm. D) which will be more beneficial for Pharmacist to improve their knowledge and practice in Pharma fields.

The clinical training experiences should be required for the completion of graduation.

Also, the Register Pharmacist should not lend his Licence to someone for the sake of money. The norms should be stringent enough so that the use of licence should be done properly. There should be some newer, updated requirements and operative laws and circulars which will help in enhancing pharmacy practice scenario in country.

There should be provision of legislation which will provide a significant advantage toward limiting unethical marketing and selling techniques used to exist through some of the medical representatives while promoting their medicines to physicians. In many cases, it may be the case that a pharmacist is not available at the pharmacy to ensure that quality products and services are

receive in developing countries is less than that received in the United States. This should be critically studied and solution for the same should be created.

Patients are viewed as customers, as long as they can pay for the goods, they are able to receive them. This economic drive should be avoided. We are health care provider, its our prime concern to look after patients. Pharmacists should actively involve in patient counseling, dispensing and monitoring patient's record. Pharmacists should be highly respected and considered as their first choice to consult about drugs. While the pace of pharmacy education change has been relatively rapid over the past decade, the overall pace of change in pharmacy practice, particularly the private sector, may have been slower.

Studies must be pointed toward the need to standardizing the basic knowledge and skills of registered pharmacists in India. Enhancements to the teaching and learning environment are being made to improve learning outcomes and ensure graduates are ready for the demands of future practice. These are promising signs and pharmacy education appears to be in a phase of rapid and positive change.

Some private institutions may be delivering a better education to students than public and government colleges and these organizations may in fact be advancing pharmacy education in some locations. We can join hands to stimulate the discovery, dissemination and application of research to use of improve patient health.

Pharmacists truly are part of a global profession. Some countries have a more advanced pharmacist role than what we do in the India.

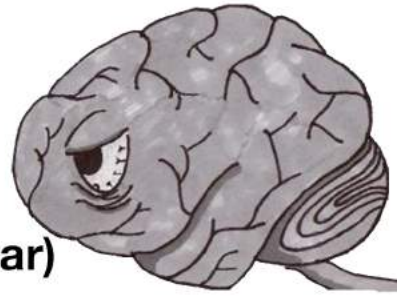
Despite the adversity that faces academics and practitioners alike, there is a strong and uniform desire to advance the science and practice of pharmacy. For this reason, we are optimistic that the future of pharmacy education and practice in the India will be as positive as it is elsewhere in the world.

**This is an excerpt from the prize winning essay by Piyush Bafna in the essay writing competition organised by Doctor of Pharmacy Association. You can read the whole essay at <http://bit.ly/14F0kul>**



# Encephalitis Lethargica: When the World Fell Asleep

-Shreya Jain B. Pharm (3<sup>rd</sup> Year)



During and after the First World War, a strange illness devastated millions of people all over the world, leaving them in an unresponsive frozen state. Many died, and those who didn't, continued to live in a kind of "slumber" wherein the body presented all signs of sleep, but the person was actually aware of his surroundings.

The epidemic left medical scientists baffled and the disease was given the name "Encephalitis lethargica", which literally means "inflammation of the brain that makes you tired". It was more commonly known as "the sleepy sickness".

The acute phase was characterized by general unease, double vision (diplopia), deep somnolence, and sometimes mild fever. Around 20-40% of encephalitis lethargica sufferers died during this acute phase, usually due to respiratory failure. Recovery of those who survived proved to be just an illusion, as it turned out to be a multi-stage disorder. The second phase resembled chronic fatigue syndrome (CFS) and was characterized by a general loss of concentration and interest in life. The second phase was followed by post-encephalitis parkinsonism (PEP), after a gap that could be as short as a few days or as long as 30 years. This was caused due to localized progressive neurodegeneration after the acute phase.

The progressive neurodegeneration presented itself in different ways for different age groups of those affected. Younger children, between 5 and 10 years old, might merely irritate with their clinginess, their impaired concentration, their incessant restlessness and need for noise, and their lack of consideration for others (somewhat like current attention deficit disorders). But as they grew in strength, these symptoms escalated in violence, and they posed a threat to themselves as well as others. Behavioral problems included cruelty to anyone who crossed them, destructiveness, lying, and self-mutilation. When they reached adolescence, these patients manifested excessive sexuality, including sexual assault regardless of age or gender. These children were not driven by self-interest, but predominantly by impulsiveness. Some of them improved after adolescence. Those who did not, eventually succumbed to parkinsonism as they entered adulthood. This post-encephalitic parkinson-

ism was the last, interminable phase of the disease. The patients experienced a loss of internal drive, which separated them from their world. Despite normal intelligence, these patients could not summon the will power to execute their wishes. They developed a kind of apathy and were unable to connect emotionally with anything. For example, while listening to music, patients could appreciate that a pianist played with great technical skill, but they no longer sensed the beauty of the music. This inability to interact with the world, combined with their inexpressive, immobile, parkinsonian face and their muscular rigidity, lent them the aspect of a puppet or statue.



*[Instances from Awakenings (1990 film) depicting the catatonic state of encephalitic patients.]*

In 1928, the encephalitis lethargica epidemic disappeared as suddenly as it had appeared. New cases stopped being reported, but those affected were housed in institutions for decades.

In 1969, over forty years after the strange disease disappeared, some catatonic victims were treated with a newly developed antiparkinsonian drug called Levodopa. A number of patients improved dramatically upon treatment – they stood up from their wheelchairs and became conscious, responsive, and aware of the world around them – but it was soon evident that their miraculous recovery was tragically short-lived. Patients began to experience side effects of L-Dopa, which included convulsions, paranoia and psychotic behavior, and eventually regressed back into their catatonic state. The 1990 movie *Awakenings* is based on such experiences described in the memoirs of Dr. Oliver Sacks.



The cause of the epidemic is still unknown, but different hypotheses have been suggested. Due to the profound psychiatric changes in children, as well as adults affected by the disease, it was initially assumed that the cerebral cortex was the site of damage. But it was later found that the major damage was caused to the brainstem. Viral origins were also investigated, but no evidence of viruses was found in the tissue samples taken from the brains of the original victims. A few researchers investigating this disease discovered a common thread in all the cases: most patients complaining of a sore throat before the disease struck. The researchers narrowed the common thread down to a particular strain of bacteria called diplococcus, known to cause sore throats. Though the evidence is insufficient to be certain, the findings of these researchers strongly suggest that the sleepy sickness epidemic was caused by the body's massive over-reaction to these bacteria.

It seems that this excessive immune response caused the immune system to attack the nerve cells of the brain, resulting in significant damage. Further research has detected anti-brain antibodies present in those with the condition, further supporting the auto-immune theory.

Research is still ongoing to determine the etiology of the disease as even though there hasn't been an outbreak as large as the one described above, isolated cases still continue to appear.

#### References:

- <http://www.damninteresting.com/the-sleepy-sickness/>
- <http://www.encephalitis.info/information/types-of-encephalitis/encephalitis-lethargica/>
- <http://theconversation.com/a-viral-infection-of-the-mind-the-curious-case-of-encephalitis-lethargica-660>
- R R Dourmashkin. "What caused the 1918-30 epidemic of encephalitis lethargica?" Journal of the Royal Society of Medicine (Volume 90), September 1997.

## **NO SHAVE NOVEMBER** - a concept misunderstood?

The tradition of No Shave November can be traced to Australia in 2004. A group of 30 men organized an event and grew moustaches for 30 days to raise **awareness for prostate cancer and depression in men**. The concept of No Shave November has been used for numerous other causes to raise money and awareness.

The goal of No-Shave November is to grow awareness by embracing our hair, which many cancer patients lose and letting it grow wild and free! Donate the money you usually spend on shaving and grooming for a month to educate about cancer prevention, save lives and aid those fighting the battle.

In 2013, No Shave November partnered with the American Cancer Society to ensure that the funds raised in the annual campaign would be distributed to the areas of research, prevention, education and care. With every penny raised, No Shave November gets one step closer to eradicating the disease.

Sadly, No-Shave November has become more of a cultural event than a charity cause. People skip out on the razors, shaving cream and other grooming products during November but the real reason for doing so — to raise cancer awareness — is being replaced with a month-long adventure into the depths of hair growth. As with many things that are driven by social media, the message behind the "No-Shave" lifestyle has gotten lost along the way to stardom.

Is it a concept misunderstood by the youth all around the world? Shave or No-Shave, **Donate.**



# The knowns and unknowns of Off-Campus Thesis

-Shravan Morla B. Pharm (4<sup>th</sup> Year)

**Are** you planning to do an under graduate thesis abroad? If yes, here are few points you need to know before going any further.

1. A good GRE score will increase the chances of getting into a good university. Irrespective of the research exposure and experience one has had in their under graduation, a poor GRE score would lead to one getting disqualified for the program. Higher the score, greater are the chances of one getting selected. So, take the GRE in III year. I can say from my personal experience at the University of Kansas that the time one could devote to prepare for GRE while simultaneously working on their thesis would be very less. Since, GRE score is valid for a period of 5 years, there is no harm in writing it in your III year.

2. Determine a field of interest in which you would like to do research. Be careful while choosing this! This will inevitably be the field where you will be doing Masters and/or Ph.D. So make a right decision. Then, search for a professor who is working in your field of interest. So, how do you search for a professor?

- Approach the faculty at BITS who are working in a related field and look if they have any suggestions or contacts that they could help you with.

- Go to different university websites and look at the faculty profiles and their research fields. Do the same by looking at the R&D division of industries.

- You need not limit your research to industries in the USA. There are excellent research facilities and great work is being done in many other countries (Singapore, Germany, etc.) .

3. Once you are familiar with the area of interests and the professors who are working in that field, email the professors expressing your interests to be part of their work with an attachment of your CV. Make this email short, but still be able to show that you are interested in their work. You could state a research publication of that professor that you have read and found interesting. You could even ask some questions you have from that and make it an interactive email. This increases the chances of not only getting a reply but also making you stand apart from many such applications they receive.

## What matters during Graduate admissions?

- |  |                                |
|--|--------------------------------|
| 1. GPA                                       | 2. GRE score                   |
| 3. Research Experience                       | 4. Publications                |
| 5. Poster Presentations/Conferences attended | 6. Extra-Curricular Activities |
| 7. Good LOR                                  |                                |

## Undergraduate Research Exposure – My perspective

### The Good

1. One learns various techniques and tools that are used in a particular field of study
2. Always updated with the ongoing research across the world
3. Helps in buliding up a strong resume by presenting the work done at different conferences and publishing it in reputed journals.

### The Bad

1. Starting to be part of research from II year, without even being exposed to different fields, is too early to determine the field in which you will be working for the rest of your life.
2. The no-attendance policy of BITS makes it easy to work in a lab by skipping course work and this would surely have consequences at a later point.





# Are you ready to GET PLACED?

-2012 batch of M.pharm

**Remember** the time you were filling in your preferences for admission into BITS? Your dad calls up a friend of his, whose son already studies at Pilani Campus. You talk to him, he tells you what the past year cut-offs were and what the state of placements for different branches is. And then, you get into BITS believing that you will be placed because you, after all, made it into BITS among the not so lucky people in the country, and because that son of your dad's friend did too and he wasn't even that smart! It is only in the beginning of your fourth year, after the first company interview, you realize that it may not really be as easy as you thought.

Most of us are completely ignorant about the placement process. Most of us believe a >8 gpa will land us in a decent place. I hate to break it to you, but that is one of the biggest lies you are telling yourself. There are some, who get placed in the very beginning of the placement season (yes, including 90% of the CS/IS people), call it sheer luck or hard work, but the percentage of such students is small. Pharmacy placements are trickier (I'd say, trickiest). The hiring patterns for pharma companies are different. If you are sitting for placements soon, especially looking for a core pharma job, the following might be of some use:

## **1. Focus on the basics**

It is relatively easy to make your way to the final technical interview when sitting for a pharma company, mainly because the aptitude tests are not as challenging as to what most of the BITSians are used to. Final interviews can last from anything between 15 minutes to 2 hours. And blunders are just not acceptable. Saying things like "I don't know if the polymer I made nanoparticles with in my LOP was cationic or anionic" is bound to get you out. Focus on the research work you have done all along. Read the reports. Read the published papers. Memorize if need be. Go through your notes/slides of the compulsory courses you've studied.

## **2. Sell like a professional**

Spend at least 100 hours in perfecting your resume. Create multiple versions of your CV for different roles that you are interested in. Invite comments on it from friends, both students and working professionals. Exercise your judgment and decide which inputs are worth incorporating. Being a fresher, keep your resume short and crisp. Clean up your Facebook and LinkedIn accounts to remove unseemly pictures and distracting content.

## **3. Don't go after the package**

There is no shortcut to success. It only comes with determination, hard work and commitment. It's no news that starting packages in pharma companies are relatively lesser than other companies. But what we fail to understand is that it is not like learning JAVA or writing a few lines of code. This is an expert area and taking a crash course does not help. When a human life is concerned, only the expert and experienced are approached. Being in the pharma field, one has to start low, gain experience and move swiftly up the ladder.

## **4. Pitch for recruitment**

Considering the less number of students and the great efforts it takes to bring pharma companies to campus for placements, it is a good idea if students participate in the pitching process. You should be aware that students need not always wait for companies to come to them. It is they who should approach the companies. If you check out the websites of these companies, you will see that some of them have a section specifically for students for off-campus placements or for internships. Students should take advantage of this to get a step-hold into the company. Choose not more than two-four people in one class to deal with making calls to companies. Others can help with the database and logistics when needed.

Enjoy your placement – it's the beginning of what you will professionally be in life. But remember, it is better to be prepared than sorry. All the best!



# ALL YOU NEED TO KNOW ABOUT

Since December 2013, more than 6,000 people have been affected by the Ebola virus outbreak in West Africa. With no available treatment and awareness, the current outbreak has had more cases and deaths than all previous outbreaks combined. The epidemic began in Guinea and then spread to Liberia, Sierra Leone, Nigeria, Senegal, the United States and Spain. Serious, isn't it? Very serious indeed! Here is everything you need to know about Ebola virus:

## ***What is Ebola Virus?***

Ebola virus (EBOV, formerly designated Zaire ebola virus) is the most dangerous of the five known viruses within the genus Ebolavirus. The EBOV genome is a single-stranded RNA approximately 19,000 nucleotides long. It encodes seven structural proteins: nucleoprotein (NP), polymerase cofactor (VP35), (VP40), GP, transcription activator (VP30), VP24, and RNA polymerase. It is a filovirus.

## ***How did Ebola originate?***

The first recorded outbreak of Ebola Virus Disease (EBD) occurred in Southern Sudan in June 1976. A second outbreak soon followed in the Democratic Republic of the Congo (then Zaire). Virus isolated from both outbreaks was named "Ebola virus" by Belgian researchers after the Ebola River, located near the Zaire outbreak.

## ***How is EBD caused?***

Human-to-human transmission can occur via direct contact with blood or bodily fluids from an infected person (including embalming of an infected dead person) or by contact with objects contaminated by the virus, particularly needles and syringes. Primary reason for the spread is the poor health systems in parts of Africa. Bats are considered the most likely natural reservoir of the EBOV. Fruit bats are also eaten by people in parts of West Africa where they are smoked, grilled or made into a spicy soup.


## ***What are the symptoms of Ebola virus disease?***

Nausea vomiting, diarrhea (may be bloody), red eyes, raised rash, chest pain and cough, stomach pain, severe weight loss, bleeding, usually from the eyes, and bruising.

## ***What is the pathophysiology?***

Endothelial cells, macrophages, monocytes, and liver cells are the main targets of infection. After infection, a secreted glycoprotein (sGP) known as the Ebola virus glycoprotein (GP) is synthesized. Ebola replication overwhelms protein synthesis of infected cells and host immune defenses. The GP forms a trimeric complex, which binds the virus to the endothelial cells lining the interior surface of blood vessels. The sGP forms a dimeric protein that interferes with the signalling of neutrophils,



The background of the entire page is a high-magnification electron micrograph showing several Ebola virus particles. These particles are long, thin, and filamentous, with a distinct outer envelope and a darker, more uniform inner core. They are scattered across the field of view, with some appearing in cross-section and others in longitudinal view. The overall color palette is a mix of reds, oranges, and yellows, typical of certain electron micrographs.

By-  
Jasleen Sachdeva and Sagarika T.  
B.Pharm (4<sup>th</sup> Year)

a type of white blood cell, which allows the virus to evade the immune system by inhibiting early steps of neutrophil activation. These white blood cells also serve as carriers to transport the virus throughout the entire body to places such as the lymph nodes, liver, lungs, and spleen. The presence of viral particles and cell damage resulting from budding causes the release of chemical signals (to be specific,  $\text{TNF-}\alpha$ , IL-6, IL-8, etc.), which are the signaling molecules for fever and inflammation. The cytopathic effect, from infection in the endothelial cells, results in a loss of vascular integrity. This loss in vascular integrity is furthered with synthesis of GP, which reduces specific integrins responsible for cell adhesion to the inter-cellular structure, and damage to the liver, which leads to improper clotting.

#### ***What are the latest medical developments?***

Favipiravir, also known as T-705 or Avigan, is an experimental anti-viral drug being developed by Toyama Chemical of Japan with activity against many RNA viruses. The mechanism of its action is thought to be related to the selective inhibition of viral RNA-dependent RNA polymerase. Favipiravir does not inhibit RNA or DNA synthesis in mammalian cells and is not toxic to them. It inhibits viral gene replication within infected cells to prevent propagation, while other anti-viral drugs often are designed to inhibit the release of new viral particles to prevent the spread of infection.

#### ***What is WHO doing about it?***

The World Health Organization and Centre for Disease Control has provided a “roadmap” estimating the immediate humanitarian costs to exceed \$495 million. The United Nations has increased this estimate to \$600 million. These amounts will finance desperately needed personal protective equipment for health workers, emergency treatment units and personnel salaries.



# surgeries in Ancient INDIA

-Saumith B.Pharm(3<sup>rd</sup> Year)

**2600 years** ago Sushruta and health scientists of his time conducted complicated surgeries like cesareans, cataract, artificial limbs, fractures, urinary stones and even plastic surgery and brain surgery. Usage of anesthesia was well known in ancient India. Deep knowledge of anatomy, etiology, embryology, digestion, metabolism, genetics and immunity is also found in many texts. Sushruta (also known as "Father of Indian Surgery" and "Father of Indian Plastic Surgery") was a surgeon who lived in ancient India and is the author of book "Sushruta Samhita", in which he describes over 120 surgical instruments, 300 surgical procedures and classifies human surgery in 8 categories. He lived, taught and practiced his art on the banks of the Ganges in the area that corresponds to the present day city of Varanasi in North India.

In his treatise, Shushruta Samhita, he classified surgery into eight types:

Aharyam = extracting solid bodies

Bhedyam = excision

Chhedyam = incision

Aeshyam = probing

Lekhyam = scarification

Vedhyam = puncturing

Visraavyam = evacuating fluids

Sivyam = suturing

Shushruta worked with 125 kinds of surgical instruments, which included scalpels, lancets, needles, catheters, rectal speculums, mostly conceived from jaws of animals and birds to obtain the necessary grips.

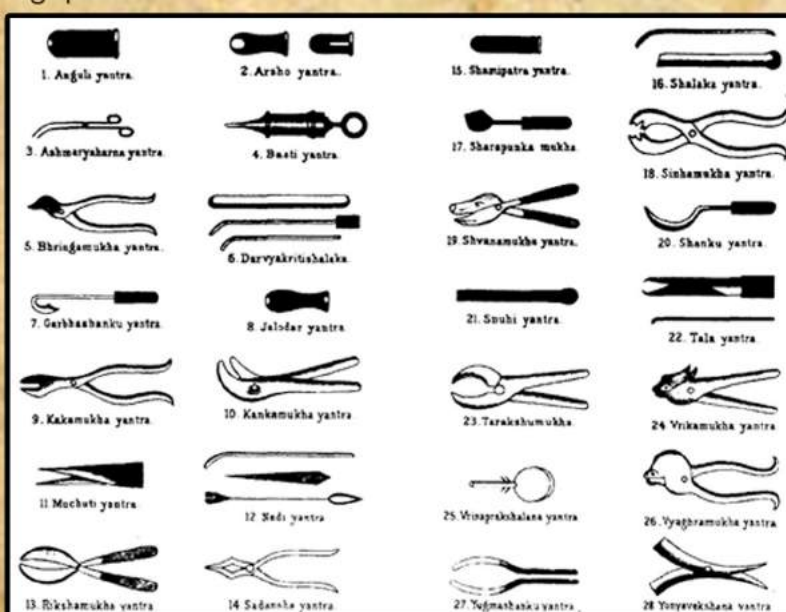
Surgeries mentioned in Sushruta Samhita:

1. Rhinoplasty
2. Lobuloplasty
3. Repair of hare lip.

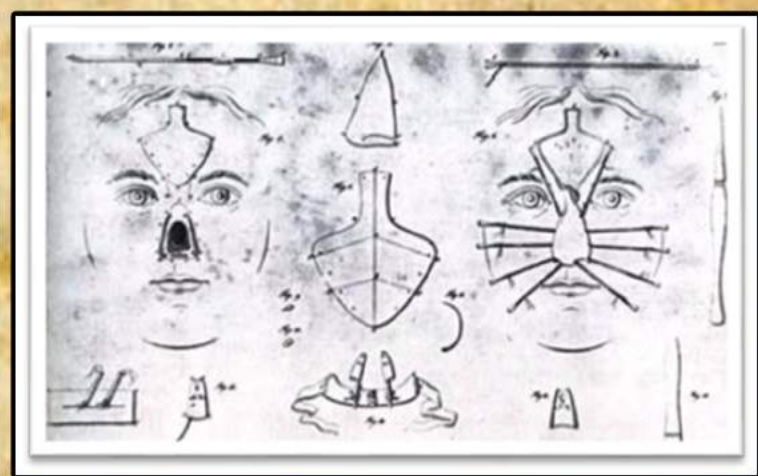
Rhinoplasty remains greatest highlight of Sushruta's surgery.

Sushruta is considered as the innovator of the Rhinoplasty technique practised since 600 B.C. The detailed description of the Rhinoplasty operation in Sushruta is amazingly precise and comprehensive.

"The portion of the nose to be covered should be first measured with a leaf. Then a piece of skin of the required size should be dissected from the living skin of the cheek, and turned back to cover the nose, keeping a small pedicle attached to the cheek. The part of the nose to which the skin is to be attached should be made raw by cutting the nasal stump with a knife. The physician then should place the skin on the nose and stitch the two parts swiftly, keeping the skin properly elevated by inserting two tubes of eranda (the castor-oil plant) in the position of the nostrils, so that the new nose gets proper shape. The skin thus properly adjusted, it should then be sprinkled with a powder of liquorice, red sandal-wood and barberry plant. Finally, it should be covered with cotton, and clean sesame oil should be constantly applied. When the skin has united and granulated, if the nose is too short or too long, the middle of the flap should be divided and an endeavor made to enlarge or shorten it."



[Various surgical instruments]



[Picture depicting a nose surgery]



## Reconstructive Surgery in India

In 1792 Tippu Sultan's soldiers captured a Maratha cart-driver named Cowasjee (Kawasji) in the British army and cut off his nose and an arm. A year later, a kumbhar (potter) vaidya in Puna reconstructed Kawasji's nose. Two British surgeons in the Bombay Presidency, Thomas Cruso and James Findlay witnessed this skilful procedure and noted the details. In October 1794, this account was published in *The Gentleman's Magazine* of London, describing it as an operation 'not uncommon in India and has been practiced for time immemorial'! This procedure, similar to that cited in the *Sushrut Samhita*, ultimately changed the course of plastic surgery in Europe and the world. It was different from Sushrut's, in that Kawasji's graft was taken from his forehead. Sushrut grafted skin from the cheek. To aid healing, he prescribed the use of three herbs and cotton wool soaked with sesame seed oil in dressing the graft. After the graft healed, he advocated cutting off the tissue joined to the cheek. Regarding cosmetic surgery, Sushrut could also reconstruct ear lobes and enumerates fifteen ways in which to repair them. Guido Majno in "*The Healing Hand: Man and Wound in the Ancient World* (1975)", notes that, "Through the habit of stretching their earlobes, the Indians became masters in a branch of surgery that Europe ignored for another two thousand years." Sushrut meticulously details the pre-and post-operative procedures. After stitching, for example, he prescribes dressing the lobe by applying honey and ghee, then covering with cotton and gauze and finally binding with a thread, neither too tightly nor too loosely. Torn lips were also treated in a similar manner (Sutrasthan 16/2-7, 18, 19).



*[Nose Reconstruction was developed in India by the Hindu Surgeon Susrata in 500B.C. This Technique of rhinoplasty is widely practiced by plastic surgeons today]*



*[Susruta, 500 B.C]*



# Interview:

**Srikant Viswanadha Ph. D**

**Vice President- Drug Discovery at Incozen Therapeutics(P) Ltd.**

**About Dr. Srikant:**

Srikant Viswanadha joined Incozen Therapeutics Ltd. in 2008. In his current role, Srikant is responsible for overseeing the progression of molecules from basic screening to lead identification and subsequent development across programs. Srikant has over 11 years of research experience where he worked in the areas of oncology, metabolic disorders, pain, and inflammation.

**Can you tell us about yourself and share your experience as the Vice-President of Incozen Therapeutics?**

I have a Bachelor's degree in veterinary science, a Ph.D in Nutritional Biochemistry from Virginia Tech. I worked for about 4 or 5 years in National Institute of Health in Bethesda and then following that, had a stint with Glenmark Pharmaceuticals. I worked there for about 2 years and then I came out of there. I was one of the founding members of Incozen. So, right now I take care of the whole drug discovery at Incozen.

**You hold a Bachelor's Degree in veterinary medicine and now you work for Incozen. Why and How did this transformation come about?**

I wasn't really interested in treating animals. I mean I became a veterinarian by chance. Obviously, you know what happens when you don't get a medical degree. It's a good thing that I was in veterinary science because, I kind of gradually transformed- I did a Masters in nutrition in Idaho- that was more in dairy nutrition. Then following my Masters I was still working on Metabolism and that's when the transformation happened from dairy animal nutrition all the way to small animals and the whole connectivity with human diseases. That's actually where the transformation happened.

**You have over 11 years of experience in research and you have worked in the areas of Pharmacology, Metabolic disorders, and pain and inflammation. How have things changed in the past few years? Do you see any increase or decrease in participation in research?**

Yes. There's been a tremendous change in what I have seen in the last ten to twelve years. People were more confined to what they were doing- they just stuck to their own research, without collaborations. But now, I think in the last five to six years, collaborations have increased both between academics and industries as well as between different academics. Collaboration between academics and industries can make the research process faster.

**Can you tell us something about process of drug discovery in India?**

I can't comment on what the companies do and how they go about drug discovery, but as far as Incozen goes, we try to do it cost effectively and in a timely manner- try to churn out things because that's where the whole competition lies. We have to get the market as soon as possible, before your competitors.

**What are the career opportunities you offer at Incozen and are the students at BITS eligible for that?**

We have all departments- Pharmacology, In-vivo Biology, Pharmacokinetics, Analytical pre-formulation work etc. So there are several different areas in which students can either apply as trainees or for employment. There is a good synergy between what students at BITS do and what we do back there in Incozen.

**Any message for our readers?**

Nothing, just enjoy your life in college and be sincere in whatever you do.





# Plants in Drug Discovery

- Dr. A Sajeli Begum

**Plants** continue to make significant contribution in the area of drug discovery and development holding a big promise for newer pharmaceuticals, as they offer a diverse range of structures beyond the rationale synthetic strategies of combinatorial chemistry. An assortment of biosynthetic pathways in plants has provided an array of lead structures for medicinal chemists to develop biologically active pharmacophores. However, with the advent of robotics, combinatorial chemistry, in silico – molecular modeling and other methodologies, the pharmaceutical R & D has largely moved away from phytochemicals for leads and prospective drug candidates. But, the interest in “rediscovering natural products” has been rekindled on seeing the number of New Chemical Entities in drug development pipelines declining. This was realized from the data published by David J. Newman and Gordon M. Cragg from National Cancer Institute, Maryland. They have also inferred that out of 1073 New chemical entities so far discovered, only 36 %, are found to be truly synthetic and the rest 64 % are natural products (NPs), NP-derived, NP-inspired drugs [Ref: Natural products as sources of new drugs over the 30 years from 1981 to 2010., Journal of Nat. Prod. 75 (2012), 311-338]. So, natural products have pointed out the way to future drug discovery. No doubt that many significant advances in Science & Technology have been inspired by the pursuit of capturing the value of natural products.

A survey of plant derived pure compounds used as drugs in countries hosting WHO-Traditional Medicine Centres indicated that, 122 compounds isolated from 94 plant species are used for treating various diseases. Some important plant drugs, which led to the development of effective therapeutic agents are given below.

(i) Khellin, isolated from *Ammi visnaga* (L) Lamk., which led to the development of chromolyn (in the form of sodium chromoglycate) as a bronchodilator.

(ii) Galegine, from *Galega officinalis* L., which was the model for the synthesis of metformin and other bisguanidine-type antidiabetic drugs.

(iii) Papaverine from *Papaver somniferum* which formed the basis for verapamil used in the treatment of hypertension. *P. somniferum* is a better known source of painkillers such as morphine and codeine.

(iv) Quinine, an antimalarial drug, from the bark of *Cinchona officinalis*. Quinine formed the basis for the synthesis of the commonly used antimalarial drugs, chloroquine and mefloquine which largely replaced quinine in the mid 20th century.

(v) Artemisinin, from *Artemisia annua* (Quinhaosu), gained prominence as antimalarial drug with the emergence of resistance to chloroquine and mefloquine. Artemisinin analogues are now used for the treatment of malaria in many countries.

(vi) Reserpine, isolated from *Rauwolfia serpentina* is used as antihypertensive.

(vii) Ephedrine, from *Ephedra sinica* - basis for the synthesis of the anti-asthma agents (beta agonists), salbutamol and salmeterol.

(viii) Tubocurarine, isolated from *Chondrodendron* and *Curarea* species is used as muscle relaxant.

Plants have a long history of use in cancer. Some of the best known plant derived anticancer drugs in clinical use are given in the following table. Very recently one of the first “plant-derived” tubulin interactive anticancer compounds to enter clinical trials, maytansine from the Ethiopian tree *Maytenus serrata*, was effectively granted a new lease of life as a slightly modified “warhead” on a monoclonal antibody.

## Limiting factors in Plant-based Drug Discovery

The availability of the quantity of a chemical entity for development and market needs is the major limiting factor for the pharmaceutical industry's interest in phytochemicals. Supply issue with the plant derived products can be solved through biomass production, tissue culture and appropriate harvest techniques. Drug discovery through plants research have been scaled down by many pharmaceutical industries due to lengthier, time consuming and complicated purification processes. So, current trends towards plant-based drug discovery should involve a multifaceted approach combining advanced phytochemical, biological, high-throughput screening and molecular techniques.

## Conclusion

An important feature, in addition to the structural diversity of phytochemicals is that they often possess highly selective and specific biological activities based on mechanism of action. An excellent example is tubulin assembly promotion activity of paclitaxel, which would not have been discovered without a plant derived lead and investigation of its mechanisms of action. The urgent need for new pharmaceuticals for the treatment of cancer, HIV and other infectious diseases, as well as a host of other diseases, demands a vigorous exploration of all approaches to drug discovery, and it is clear that plants have played, and will continue to play, a vital role in this process.

Table: Important plant derived anticancer drugs in clinical use

S. No	Compound name	Lead compound /Plant	Uses
1	Vinblastine	<i>Catharanthus roseus</i> G. Don.	Lymphomas, leukemia, testicular, breast, lung, and Kaposi's sarcoma
2	Vincristine	<i>Catharanthus roseus</i> G. Don.	-do-
3	Etoposide & Teniposide	Epipodophyllotoxin (Lignans)/ <i>Podophyllum peltatum</i> L. and <i>P. emodi</i> W.	Lymphomas and bronchial and testicular cancers
4	Paclitaxel	<i>Taxus brevifolia</i> Nutt., <i>T. Canadensis</i> M., <i>T. Baccata</i> L.	Breast, ovarian and non small lung cancer
5	Docetaxel	Paclitaxel	-do-
6	Camptothecin	<i>Camptotheca acuminata</i> D.	Cervical cancer
7	Topotecan	Camptothecin	Ovarian and small cell lung cancer
8	Irinotecan	Camptothecin	Colorectal cancer
9	Homoharringtonine	<i>Cephalotaxus harringtonia</i> V.	Acute and chronic myelogenous leukemia
10	Ellipticine	<i>Bleekeria vitensis</i> A. C. Sm.	Breast cancer
11	Elliptinium	Ellipticine	Breast cancer



# Atmos'14 : the National Annual Technical Festival

-Asmitha V B. Pharm (3<sup>rd</sup> Year)

**A technical fest** in a college like BITS Hyderabad definitely rises up the expectations of people across the country. ATMOS'14 witnessed a plethora of events from all the associations and Panacea, the pharmacy association also contributed its best to reach those expectations. Listed below are the details of all the events.



• **Paper Presentation:** From a presentation on the epidemic outbreak of Ebola to a presentation on Gold nanoparticles as carriers in drug delivery, the paper presentation surely gave a fair idea to the audience about the topics chosen by the participants. Pharmacy paper presentation, conducted on 10<sup>th</sup> of November, saw a participation from 5 teams, each team presenting about a topic of their own choice. It had the participants research about the topic and present it to the audience and judges followed by answering the questions posed by the judges. Worthy of all the appreciation, Mr.-Sumeet Chawla and Mr.Saumith Dahagam of our very own campus bagged the first prize!



• **Anatomy of Murder:** All of us must have experienced an Adrenaline rush while seeing shows like Dexter, CSI etc. If given a chance, who would not want to live in those characters and unravel those mysteries and unveil the murderer! For all those Sherlocks out there, Anatomy of murder was a dream come true. Organized jointly by the chemistry, biology and the pharmacy departments, "anatomy of murder" made the participants analyze the crime scene, gather all the clues and finish the puzzle by finding the murderer. The event was conducted in two rounds: the first round was a written quiz and second one was a crime scene investigation. Enthralled by the huge number of participants, the organizers were more than satisfied with the event. Fastest in solving the staged crime, Jyothi Gautam and Meenakshi Joshi from BIT PILANI HYDERABAD bagged the first prize!



• **Nature o' Trivia:** Everybody has a corner of their brain which serves as a repository for all the interesting facts and trivia about the nature. Nature O' trivia, a quiz conducted by Panacea in association with the Biological Sciences association-Synapsis made all the participants recall that information. The event witnessed a whopping number of participants engaging their grey cells in guessing the answers to the questions posed by the organizers. Fastest and accurate in answering the questions, Mr. Sree Nihit and Mr. Aditya Rane stood first in Nature O' Trivia.

• **Guest lecture:** Dr. Srikant Viswananda, Vice President of Incozen therapeutics limited, made his way to BITS Hyderabad campus to deliver a talk on "Current Trends in Biotechnology".

With all the appreciation from the audience and the participants, ATMOS'14 surely was an amazing ride and Panacea anticipates the same from the coming future.



# The Importance of Being Vaccinated

-Santosh V. B. Pharm(3<sup>rd</sup> Year)



We are no strangers to epidemics and pandemics. There is an Ebola epidemic in West Africa now. There was a global Flu pandemic in 2009 which claimed at least 18000 lives as casualties. The biggest of all was the Spanish Influenza pandemic in 1918, which was estimated to have infected around 500 million people and caused the deaths of 50 to 100 million. To put that in perspective, the number of casualties of the First World War was around 16 to 20 million, while that of the Second World War was around 60 to 80 million.

But, we have our success stories too. The development of vaccines is a scientific achievement unlike any other in terms of the impact it has had on a global scale. Smallpox, an infectious disease that is estimated to have caused the death of over 300 million people just in the 20th century alone, was certified eradicated by the World Health Organization (WHO) in 1979, thanks to extensive vaccination campaigns. It also looked like Polio was set to go by the way of Smallpox before things started going wrong.

Perhaps “started” is not the right term. I am talking about the anti-vaccination movement. This is a movement that can trace its beginning to the time of invention of the first vaccine. One could argue that at the time it was somewhat justified since the idea of vaccines was completely new and a little counter-intuitive. But there can be no justification for the continued existence of the movement. Known as “Anti-Vaxxers”, this is a small but very vocal and influential group that has been advocating the abolishment of vaccines worldwide for several years.

Of course, the existence of scientifically ignorant groups is not exactly new. There are groups which do not believe that evolution is true. And there are groups which deny that there is a problem of climate change due to human activities which can endanger the whole world in spite of all the evidence that is staring at us in our faces. But this particular anti-science stance might be more dangerous than any other such groups.

To understand why this is so, some knowledge about the working mechanism of vaccines and a concept called “Herd Immunity” is needed. Vaccines are essentially the toothless versions of the corresponding microbial agents which cause the disease.

The average immune system is able to destroy the agent and “remember” it, meaning it will be able to launch a defensive attack at once if and when there is a real microbial infection. Thus, the disease is not contracted and not spread to others either. The science behind this is solid and in an ideal world, vaccines would be 100% effective. However, for several reasons (like the immune system of a host not giving the proper response) they are not. But this makes vaccines even more important due to the concept of “Herd Immunity”. Basically, the more people of a community are vaccinated and hence immunized, the lesser are the chances of the disease spreading in the community.

Even if a person was not vaccinated or was vaccinated but did not develop an immunity due to one reason or another, the chances of him/her being infected by that disease is very low, if everyone else in their community was vaccinated, since there is no one who can spread the infection. A situation opposite to this is a vaccinated person who lives in a community where no one else was vaccinated. Now, every single member of the community has the potential to be infected and to spread the disease. This could also lead to the development of new strains of the pathogen, which might be resistant to the vaccine, meaning even the vaccinated person is not safe in that environment.

Vaccines have worked successfully for over 150 years. There have been NO proper scientific studies that have connected the use of vaccines to autism, which is one of the main arguments of the anti-vaxxers. And yet, their cause seems to be having more and more success, because of their fear-mongering methods. The spreading of infectious diseases like Polio is a potentially global problem for which that we actually have the solution. But it might end up completely useless because of a disinformation campaign of a few people and the lack of global awareness. Fortunately, there is an easy solution for this too. If you know anyone who has doubts regarding vaccinations, talk to them and make them understand its importance. At least tell them not to believe everything that they see on the internet and to consult an actual doctor for advice. It is not much- but you will actually be helping to save the world.



# Conference Alert



- International conference on computational intelligence: Health and Disease @ Institute of Bioinformatics and Computational Biology, Visakhapatnam. 27-28 Dec., 2014
- 47th Annual Conference of Indian Pharmacology Society (IPSCON 2014) @ Guwahati Medical College, Guwahati. 28-30 Dec., 2014
- International Symposium on Bio-Organic Chemistry @ IISER, Pune. 11-15 Jan., 2015
- 3rd International Conference on Nanoscience and Nanotechnology @ SRM University, Chennai. 4-6 Feb., 2015
- Conference on New and Emerging Trends in Oncology 2015 (NEO'15) @ HICC, Hyderabad, Telangana. 9-11 Feb., 2015
- Discovery Chemistry Congress @ Germany, 17-18 Feb., 2015
- World CNS Submit 2015: Modeling and Biomarkers @ Boston, US. 17-19 Feb., 2015
- Enzymes in Drug Discovery Conference @ San Diego, US. 26-27 Feb., 2015
- Protease Inhibitors in Drug Discovery Conference @ San Diego, US. 26-27 Feb., 2015
- 13th International Congress on Targeted Anticancer Therapies @ Paris, France. 2-4 March, 2015
- 4th Euro-Mediterranean Conference of Nature Products and Drug Discovery: Back to Mother Nature @ Sharm El-Sheikh, Egypt. 3-7 March, 2015
- Asia Tides 2015-Oligonucleotide and Peptide @ Osaka, Japan. 3-5 March, 2015

- NGS 2015 Milan: Towards Single Cell Analysis @ Milan, Italy. 10-11 March, 2015
- The Challenge of Chronic Pain @ Cambridge, UK. 11-13 March, 2015
- 2015 Conference on Advances in Prevention and Treatment of Cancer (CAPTC 2015) @ Suzhou, China. 18-20 March, 2015
- Managing Pain: From Mechanism to Policy @ Brisbane, Australia. 15-18 March, 2015
- RSC-BMCS Fragment based Drug Discovery Meeting @ Cambridge, UK. 22-24 March, 2015
- 10th Annual Drug Discovery Chemistry @ San Diego, US. 21-23 April, 2015
- 5th International Conference and Exhibition on Pharmaceuticals & Novel Drug Delivery Systems @ Dubai. 16-18 March, 2015
- 1st European Conference on Pharmaceuticals-Drug Delivery @ Reims, France. 13-14 April, 2015
- XIII International Conference on Pharmacy and Pharmacology @ London, UK. 16-17 Feb., 2015
- 6th Global Drug Delivery & Formulation Summit @ Dusseldorf, Germany. 9-11 Feb., 2015
- 5th Annual American Drug Delivery & Formulation Summit @ Costa Mesa, CA, US. 14-15 April, 2015
- 12th Annual Controlled Release Conference @ London, UK. 20-21 April, 2015

## *In the Department:*



*[ Freshmen orientation on 9th September 2014 ]*



## तारों की जिदद

तारों की समझ न थी मुझे,  
आसमानो में जुगनू ही समझा,  
टिमटिमाते रहे सदा, स्थिर एक जगह,  
जुगनूओ को तो कई बार पकड़ा,  
तारों का रास्ता, मेरे छत से न मिला,  
बचपन की शरारतो में तारों का हाथ है,  
उनको पाने की जिदद अब भी मेरे साथ है।

आज जिंदगी एक दौड़ भाग है,  
मिलना जुलना एक इतेफाक है,  
पर दूर आसमान में कोई अपना है बसा,  
बचपन की याद लिए समाया स्थिर खड़ा,  
मेरे जुगनू दोस्त अब मेरे साथ नहीं,  
टिमटिम करता कोई दूर होके भी पास है,  
उनको पाने की जिदद अब भी मेरे साथ है।

अमरदीप सिंह (M.Pharm)

# Poem's Corner

### About Amardeep:

Amardeep Singh is a M.Pharm 2nd Year student. Who is the constant contributor for PROBE magazine. he has always written beautiful poems. Poetry is a creative way to present one's thoughts and feelings by mere play of words.

We are proud to have such a talented poet in our department.

## Achievements:

### Ganesh Samala and A Sajeli Begum

**Symposium Name:** "15th Tetrahedron Symposium - Asia Edition"

**Date:** 28th to 31st Oct 2014.

**Venue:** Singapore Expo, Singapore.

**Title of Poster:** "Design, Synthesis and Biological Evaluation of 6-methylimidazo[2,1-b]thiazole-5-carboxylic acid derivatives as Novel Mycobacterium tuberculosis Pantothenate Synthetase Inhibitors"



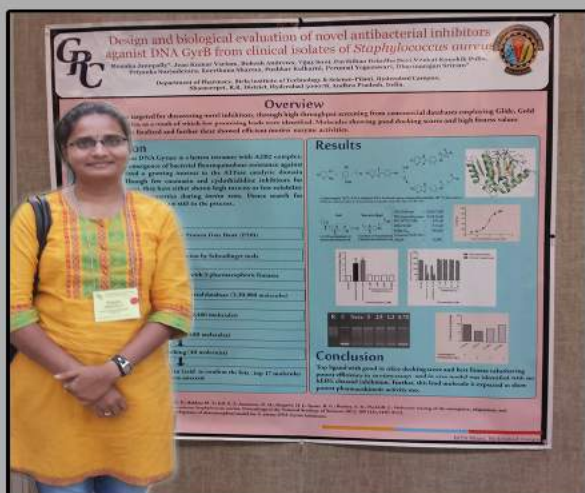
### Renuka Janaupally

**Conference:** Gordon Research Conferences

**Date:** Aug 10-15 2014

**Venue:** Sunday river resort, Newry, Maine, USA.

**Title:** Design and biological evaluation of novel antibacterial inhibitors against DNA GyrB from clinical isolates of Staphylococcus aureus







**Birla Institute of Technology & Science, Pilani**  
Hyderabad Campus



# PROBE

**The next generation explorer**

**PROBE: Volume 3, Issue 3, 2014**

**Editor In-Chief**  
**Dr. Sajeli Begum**

**Editor**  
**Sumeet Chawla**

## **Contributors**

**Venkat Koushik**  
**Shubhmita**  
**Shreya Jain**  
**Jasleen Sachdeva**  
**Sagarika T.**  
**Mahibalan**

**Piyush Bafna**  
**Saumith**  
**Asmitha**  
**Amardeep**  
**Santosh V.**  
**Rashmi Sinha**

**Design and TypeSetting**  
**Sumeet Chawla**