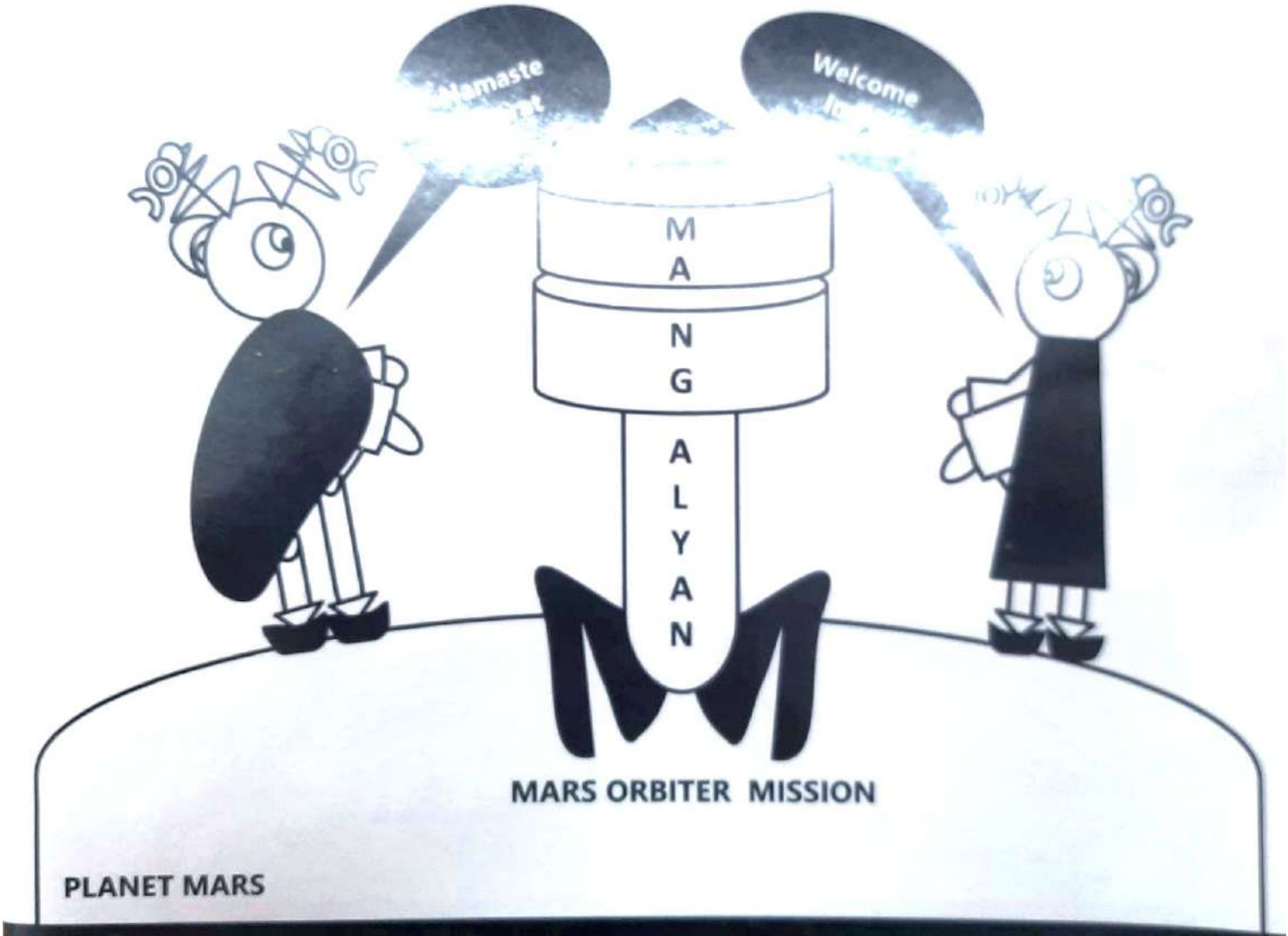
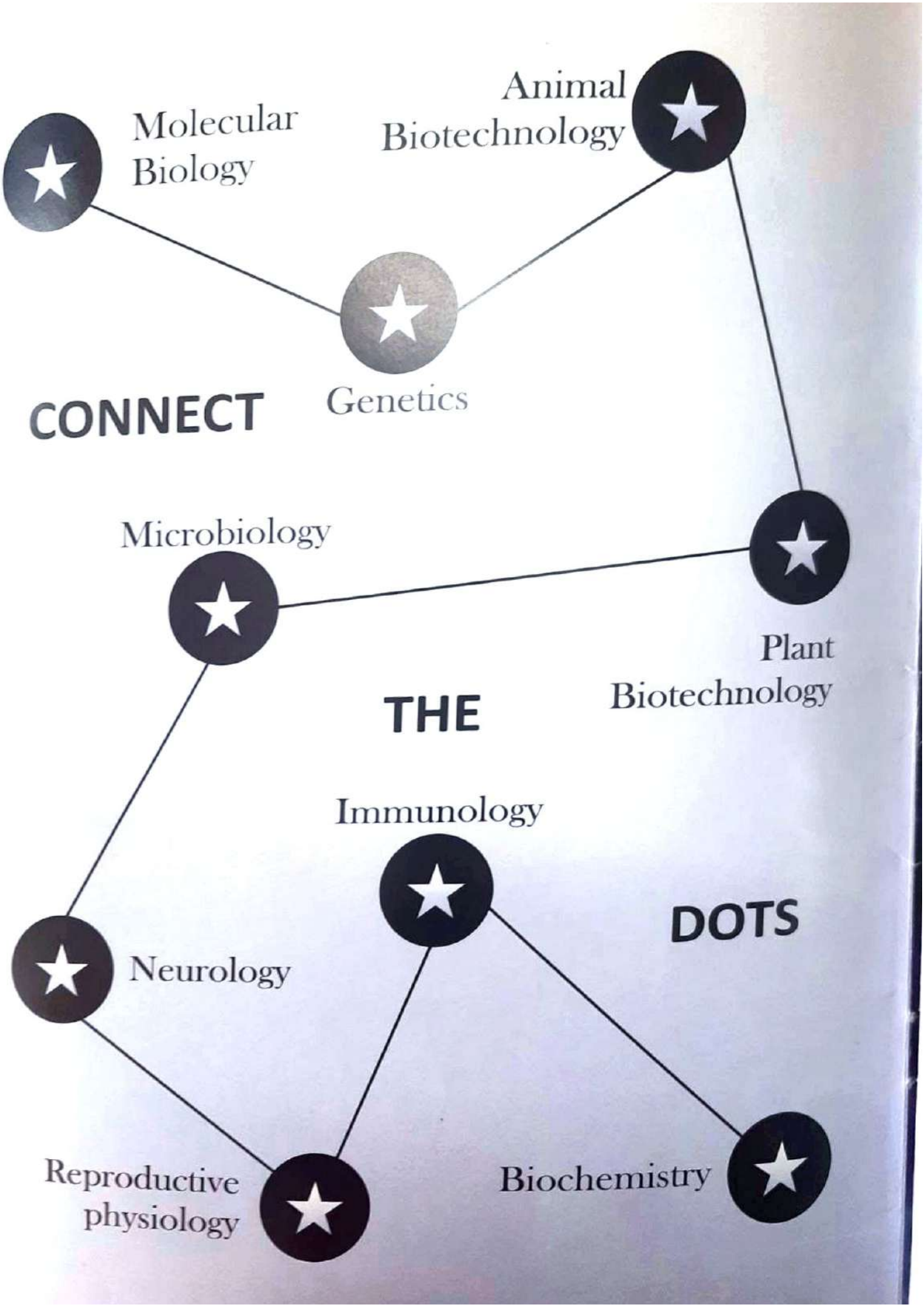
DE-NOVO
2014-2015

Where science meets creativity



NIRMA UNIVERSITY

INSTITUTE OF SCIENCE


Molecular Biology
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Microbiology
Plant Biotechnology
THE
Immunology
DOTS
Neurology
Reproductive physiology
Biochemistry

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Where science meets creativity

NIRMA UNIVERSITY
INSTITUTE OF SCIENCE

Editorial Board:
Dr. Sonal R. Bakshi, Assistant Professor, Editor
Suhani Patel, Ph.D. student as co-editor

Cover Page: Creating history, ISRO's Mars Orbiter Mission (MOM) successfully entered the orbit of the red planet. India thus became the first nation in the world to have entered the Mars orbit in the first attempt. The picture in the form of a cartoon depicts the successful Mars Orbiter Mission.

Front Cover, Back Cover by Suhani Patel.

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From the Editor's Desk...

Man on the moon, human genome, and now, reaching the Mars, milestones of human history demonstrate unlimited potential of human mind. The mangalyaan success story was the obvious and only choice for cover page this year. Celebration of success of this scale make us wonder what it takes to endure the journey. For a life science student working for Ph.D. degree, the journey is no different! Suhani has given words to these feelings, it is true that journey is also of great significance for humane training as is destination. Rahul Jog of this group has summed-up training at ISNU during his PhD as 'preparing men out of boys' in his 10th Foundation day message from Japan. It is this research inclination at ISNU and Nirma University that has brought us SIRO recognition by the DSIR, Department of Science and Technology, Gov. of India. The DSIR recognition will give further boost to ISNU research quotient nurtured by excellent ecosystem under the leadership of Director, Prof. Sarat Dalai who is first a passionate Immunologist and teacher.

The trends of research publications analyzed by our proactive library staff has also come at a right time. Apart from the number game, Dr. Vijay Kothari draws attention to novel parameters of measuring significance of publication. The ISNU Ph.D. students have given a brief account of their own research question that they are so passionately addressing.

Questions serve as appetizers of learning, even if they are forced. M.Sc. students participated in this thought provoking process in response to call by the publishers of our favorite Cell Biology book by Bruce Alberts and team.

History shows us that miracle-like innovations and wide spread essential evils penetrate the human society first, safety concerns and assessment join later. Examples; CFC, DDT, nanoparticles, and now, the omnipresent cell phone. The debate to prove or disprove the health hazard will continue, but there is some reason behind the Department of Telecommunications, GOI guidelines that daily use of not more than six minutes is recommended. With majority of us not following this, Rajvi has attempted pictorial version of do's and don'ts of cell phone use based on DOT guidelines.

The Geeta, the manual of life deserves to be brought back to lime light for the present generation, especially chapter 18 which sums up three categories of the task, the methods, the means, the motive, and the men or doer; in terms of bad, good, and the best (tamasik, rajasik, and satvik). These do's and don'ts of life narrated in the Geeta aanyone can relate to easily, and need not be confined to book stored in pooja-ghar or library. In response to our call for write-up on any one verse from chapter-18, it was a delight to know that many of the students were not unfamiliar with this book of enduring and universal significance. Very few have contributed however, it is hoped that sensitization will go a long way.

Students of life science have also contributed poetry, articles of social significance, and various other topics which has made this issue colorful between the covers!

We hope everyone will enjoy reading the original art and science of ISNU members.

Editorial Board:
Dr. Sonal R. Bakshi, Assistant Professor, Editor
Suhani Patel, Ph.D. Student, Co-editor

From Director's Desk

De Novo provides a platform to express the talents of young students, researchers and faculty. The current year has been very eventful in the history of Institute of Science. We completed 10 years of our journey in imparting quality education to masters' students in the field of Bioscience. Although we started in 2004 as a teaching institute, today we have placed ourselves among the research institutes pursuing and advancing the cutting edge research. Not only we are very diverse so far the research interests of each individual faculty members are concerned, we are equally passionate in teaching our youngsters while enjoying the freedom to pursue their dream as researcher. Efforts of last four years by all the members of Institute of Science have brought in lots of vibrancy not only in the institute, but also in the University as whole. Today faculties across the campus are lot more confident and ready to compete with established investigators in their fields of research. University authorities are more ambitious and are taking encouraging steps to uplift the environment of research. We as an institute might be a small constituent of Nirma University, but we have played a significant role in dignifying the University. I am sure that the students in the Institute of Science enjoy the nurturing academic environment and are dreaming big in their personal lives. I congratulate one and all including the editor, Dr. Sonal R. Bakshi for their contributions to bring this issue of De Novo and hope that you enjoy reading the same.

Sarat K. Dalai, Ph.D.
Professor (Biotechnology), I/c Director

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Cover story : 8 Reasons Why India's Mars Orbiter Mission Mangalyaan Is The Most Amazing Space Mission In The World

-Suhani

The Mars orbiter satellite from India, Mangalyaan, which had been on an exhausting journey towards Mars since November 5, 2013, reached an important milestone when it passed a crucial test on Monday, September 22, 2014.

- The Mangalyaan mission cost India $73 million (~Rs.450 crores) which is even cheaper than an eight lane bridge in Mumbai which cost $ 340 million. It is less than the budget of film 'Gravity' which was about $105 million and about one tenth of what the US has spent on MAVEN, making it undoubtedly the most cost effective inter planetary space mission to have ever been undertaken anywhere in the world !
- In real terms, when distributed over the population of 1.2 billion, every Indian has contributed Rs.4 per towards the mission.
- Mangalyaan will observe the environment of Mars and look for various elements like methane (marsh gas), which is a possible indicator of life. It will also look for Deuterium-Hydrogen ratio and other neutral constants.
- The orbiter weighs 1,350-kg, which is even less than the weight of an average sports utility vehicle
- The manufacturing of Mangalyaan took 15 months while NASA took five years to complete MAVEN Mangalyaan is the first spacecraft to be launched outside the Earth's sphere of influence by ISRO in its entire history of 44 years.
- ISRO will be the fourth space agency in the world after National Aeronautics and Space Administration (NASA) of the US, Russian Federal Space Agency (RFSA) and European Space Agency to have successfully undertaken a mission to Mars.
- Considering that Mars is about 670 million kilometers from the Earth, the cost of the ride works out to about Rs.6.7 per kilometre – cheaper than what even auto rickshaws charge anywhere in India!

Small Steps to Success

- Suhani Patel

When you get a hurdle your way
you should not stand and stay
But move ahead with hope
Coz if you do,
God gives you strength to cope

Its possible that troubles comes in between
Work slows, stays and stops
but you be keen
Because its only your strength
that will help you
Its only when you will fail that you will
come through

Do not be bogged down by bad times and
failed results
Do not be disappointed and don't sulk
Coz its at that hour you will realize the
efforts you have put in
And if you believe in yourself, good results
and publications you shall have to pin

At the end its about the journey we live
Its all the time and effort that we give
Never feel the learning has gone down the
drain
Coz in any situation what helps you is
your brain

So enjoy what you do
Coz pursuing passion is a privilege of
very few
Walk on the grass when there is dew
It will help explain the pleasure of things
when you grew

Our Gut Feeling

Dr. Sriram Seshadri
Assistant Professor & Academic Coordinator

When you think about strategies to achieve optimal brain performance, you may think about doing crossword puzzles or learning a new language... adding more sleep or even eating more omega-3 fats may also come to mind. Most people would not automatically think about their gut when they think about brain health... but this is actually a perfect place to look, one that may very well hold the secret to improving your mood, mental health and preventing other brain-related diseases, like Parkinson's.

Does Your Gut Hold the Key to Better Brain Health?

You may not be aware that you actually have two nervous systems: Central nervous system, composed of your brain and spinal cord Enteric nervous system, which is the intrinsic nervous system of your gastrointestinal tract

Both are actually created out of the same type of tissue.

During fetal development, one part turns into your central nervous system while the other develops into your enteric nervous system. These two systems are connected via the vagus nerve, the tenth cranial nerve that runs from your brain stem down to your abdomen.

It is now well established that the vagus nerve is the primary route your gut bacteria use to transmit information to your brain. That's right... while many think of their brain as the organ in charge, your gut actually sends far more information to your brain than your brain sends to your gut.

To put this into more concrete terms, you've probably experienced the visceral sensation of butterflies in your stomach when you're nervous, or had an upset stomach when you were very angry or stressed

The flip side is also true, in that problems in your gut can directly impact your mental health, leading to issues like anxiety, depression, and autism.

The Journal of Neurogastroenterology and Motility reported the novel finding that the probiotic Bifidobacterium longum NCC3001 has been shown to help normalize anxiety-like behavior in mice with infectious colitis. The bacteria's effect on anxiety involves modulating the vagal pathways within your gut-brain connection:

"As B. longum decreases excitability of enteric neurons, it may signal to the central nervous system by activating vagal pathways at the level of the enteric nervous system."

The probiotic Lactobacillus rhamnosus had a marked effect on GABA, inhibitory neurotransmitter that is significantly involved in regulating many physiological and psychological processes, levels in certain brain regions and lowered the stress-induced hormone corticosterone, resulting in reduced anxiety- and depression-related behavior.

When researchers severed the vagus nerve, GABA receptor levels and the animal's behavior remained unchanged after treatment with L. rhamnosus, confirming that the vagus nerve is most likely the primary pathway of communication between the bacteria in your gut and your brain.

Interestingly, just as you have neurons in your brain, you also have neurons in your gut -- including neurons that produce neurotransmitters like serotonin, which is also found in your brain. In fact, the greatest concentration of serotonin, which is involved in mood control, depression and aggression, is found in your intestines, not your brain! Perhaps this is one reason why antidepressants, which raise serotonin levels in your brain, are often ineffective in treating depression, whereas proper dietary changes often help.

Abnormal Gut Flora Fosters Abnormal Brain Development

There is a close connection between abnormal gut flora and abnormal brain development—a condition Dr. Campbell-McBride calls Gut and Psychology Syndrome (GAPS). GAPS is the result of poorly developed or imbalanced gut flora and may manifest as a conglomerate of symptoms that can fit the diagnosis of autism, attention deficit hyperactivity disorder (ADHD), attention deficit disorder (ADD) without hyperactivity, dyslexia, dyspraxia, or obsessive-compulsive disorder, just to name a few possibilities.

A study published in Neurogastroenterology & Motility found mice that lack gut bacteria were found to behave differently from normal mice, engaging in what would be referred to as "high-risk behavior." This altered behavior was accompanied by neurochemical changes in the mouse brain.

Researchers found that gut bacteria may influence mammalian early brain development and behavior, and that the absence or presence of gut microorganisms during infancy permanently alters gene expression. In a similar way, probiotics have also been found to influence the activity of hundreds of your genes, helping them to express in a positive, disease-fighting manner.

Through gene profiling, they were able to discern that absence of gut bacteria altered genes and signaling pathways involved in learning, memory, and motor control. This suggests that gut bacteria are closely tied to early brain development and subsequent behavior.

What Factors Lead to Compromised Gut Bacteria?

Your gut bacteria are an active and integrated part of your body, and as such are heavily dependent on your diet and vulnerable to your lifestyle. If you consume a lot of processed foods and sweetened drinks, for instance, your gut bacteria are likely going to be severely compromised because processed foods in general will destroy healthy microflora and sugars of all kinds feed bad bacteria and yeast.

Your gut bacteria are also very sensitive to:

- Antibiotics
- Chlorinated and fluoridated water
- Antibacterial soap
- Agricultural chemicals
- Pollution

Because of these latter items, to which virtually all of us are exposed at least occasionally, it's generally a good idea to "reseed" the good bacteria in your gut by taking a high-quality probiotic supplement or eating fermented foods. This is important for everyone, but imperative if you are a woman who is pregnant, as your newborn depends on you for its initial gut flora. Many women of reproductive age are deficient in a wide range of vitally important probiotic strains—a deficiency that transfers to their offspring, and may set the stage for any number of problems.

The baby acquires its gut flora at the time of birth, when the baby goes through the birth canal of the mother. So whatever lives in mom's birth canal, in mom's vagina, becomes the baby's gut flora. So what lives in mom's vagina? It's a very richly populated area of a woman's body. The vaginal flora comes from the bowel. So if the mother has abnormal gut flora, she will have abnormal flora in her birth canal.

Adding injury to insult is the significant decrease in breastfeeding. We now know that breastfed babies develop entirely different gut flora compared to bottle-fed babies. Infant formula never was, and never will be a healthy replacement to breast milk, for a number of reasons -- altered gut flora being one of them.

Optimizing Your Gut Flora, and Thereby Your Brain Function, is Easy

When you consider that your gut is your "second brain," it becomes easy to see how your gut health can impact your brain function, psyche, and behavior, as they are interconnected and interdependent in a number of different ways. Fortunately, optimizing your gut health is remarkably easy.

Need for More Realistic Evaluation of Impact of Research Work

-Dr. Vijay Kothari

It has been a common practice to judge research work of a researcher by looking at the Impact Factor (IF) of the journals in which he/she has been publishing. For having a general idea about quality of research, this approach seems to be not bad. But when same criteria (i.e. IF) is applied in situations (e.g. recruitment, promotions, etc.) for which it is not that much suitable, it leads to a variety of complications.

Basically IF is an indirect measure. It tells about the average citations received by an article published in a particular journal. Needless to say, each and every article in a given journal can not receive citations equal to the IF of that journal. Thus IF speaks more about the journal, and less about the individual papers published in it.

If impact (or value) of an individual paper is to be evaluated more realistically, citations received by that particular paper need to be looked, independent of the fact that it is published in which journal (and what IF that journal has). Similarly if the contribution made by an individual researcher is to be evaluated, his total citation count over his entire career (or over a certain period of time, for which evaluation is to be made) will serve as a measure, more useful and realistic than IF. In addition to total citation count, one can also compute citations per paper, h index, etc.

Let us take a simple example of two researchers (A and B) applying for a particular fellowship or promotion. Consider that A has published 5 papers in different journals with an average IF of 3, and has received 20 citations; B has published 5 papers in different journals with a lower average IF of 1, and has received 20 citations over the same period of time. Who should be selected for that particular fellowship? Based on equal citations received by both of them, it can be said that papers published by both of them are referred at same frequency by their peers. But if only IF is considered as a criteria, then despite having made same impact on the field B will miss the opportunity.

In eligibility criteria for various academic benefits, we often read that people with a total IF of 5 or 10 (or any such number) only can apply. Is it not erroneous to assume that papers published in high IF journals will automatically receive more citations? Currently many journals are operating in an open access mode, making their content openly available to a wider audience. If anybody accessing them finds their article(s) relevant, they would cite it without looking at the IF of that journal. Papers are cited based on their relevance and content, and not by looking at the name of journal in which they are published. If only the name/reputation of the journal and its IF are important, then papers published in relatively new journals would never be cited; but that does not happen. Papers from new journals (with low IF or even no IF) also get cited based on their content and relevance.

We can logically assume that if a paper is not good or interesting enough, then it will not get cited, irrespective of the journal in which it has been published. These days when it is easy to find out the citation count from Google Scholar, Scopus, etc., it would be for the betterment of science that policymakers / decision making authorities replace IF with citation count as a parameter of evaluating scientific excellence of a researcher and his contribution. Citation count can also be a good and reliable parameter for ranking of research institutes and universities.

Report on Expert Lectures

Darshna Ribadia

Attending an Expert lecture is acquiring knowledge about something we are unknown about .We had an excellent experience of guest lectures at Nirma University in 2014-15. The first lecture was conducted on 24/12/2014 by Dr Vivek Tanavde on the topic "Advances in NGS technologies : how these advances will revolutionize healthcare , agriculture & animal husbandry". The second was conducted on on 20/01/2015 by Prof.Prashant Phale, IIT Bombay on the topic, "Preferential utilization of aromatic compounds over glucose by P.Putida CSV86". The third was conducted on 17/01/2015 by Dr.Ranjeet Devakar from M.S.U. Baroda on the topic "IVF-know how ,advances and complications". The fourth was conducted on 03/03/2015 by S.R. Dave, HOD from Gujarat university on the topic, "Industrial Microbiology and Fermentation technology". And the last one was conducted on 13/03/2015 by Dr.Mahaveer P.Sharma ,ICAR-Directorate of Soyabean research on the topic, "Application of Arbuscular Mycorrizal Fungi in Sustainable Plant Production Systems". All these expert lectures were very helpful for our further studies in field of science, as we got to know more about a particular subject. The lectures were very well conducted and explained on each topics and all the doubts were cleared precisely. These guest lectures hence gave a wonderful opportunity to the students to gain knowledge of the things going on around the world in the field of science and research.

सुबह की बेला में चलति ठंड हवा
से भीगे आसमान में लीपटे बादलो की
तरह मैने अपना सफर शुरू किया
प्रचंड वेग की कीरणो से उत्पन्न
लालीमा परिवेश में हावी हो चुकी है ।
खीडकीयो से ठंडी हवा मेरे गालो को
सेहला रही है पर पोल्युटेड हवाये
मेरा कुछ बीगाड नहीं पा रही है ।
और कहती है की सीर्फ तुम हो, सीर्फ मै
हुं, मूझे अपने होने का वजुद मील गया
और इसी तरह सफर में मैं उससे
भी मील गया
जहा हजारो मुस्कुराते चेहरो के साथ
जुडे पंख उडने को बेकरार है ।

- Brijesh Mishra

નથી તોય

આંખો તળાવ નથી, તોય ભરાઈ જાય છે !
ઈગો શરીર નથી, તોય ઘવાય જાય છે !
દુશ્મની બીજ નથી, તોય વવાઈ જાય છે !
હોઠ કપડુ નથી, તોય સીવાઈ જાય છે !
કુદરત પત્ની નથી, તોય રિસાઈ જાય છે !
બુદ્ધિ લોખંડ નથી, તોય કટાઈ જાય છે !
અને માણસ હવામાન નથી, તોય બદલાઈ જાય છે !
શું આજ છે જીંદગીનું સત્ય ? નથી તોય થઈ જાય છે !!

- Patel Rushika

18th Chapter of the Geeta

यस्य नाहंकृतो भावो बुद्धिर्यस्य न लिप्यते ।
हत्वापि स इमाल्ँ लोकान्न हन्ति न निबध्यते ॥ १७ ॥

One whose mentality never considers being the doer and whose spiritual intelligence is not attached to fruitiveness; such a person even if warring with the whole world; does not actually slay anyone nor become entangled by fruitiveness.

The word ahankarah means the ego and refers to one who thinks themselves the doer of actions. It is an erroneous figment of the mind that creates misconception of I myself doing such and such action. This false notion arises out of identification with false ego. Such notions and conceptions are completely absent in those of spiritual intelligence who have surrendered themselves to the Supreme Lord. The words na lipyate means not attached to the rewards of actions. Since one of spiritual intelligence understands that they are never independent, they realise that the rewards from their actions is not of their concern. Hence they don't consider themselves the doer and are solely dependent on the Supreme Lord. Whose intelligent has been refined in this manner is known to be purified and untainted.

The inference is that although one may perform innumerable activities, they perform them not because they consider themselves only doer and they are not subject to be a recipient to receive the consequent merits or demerits resulting from any action. This highly evolved consciousness of being fully dependent upon the Supreme Lord and never considering themselves as the doer of any actions arises out of a jiva or embodied being prevalence of sattva guna the mode of goodness. Therefore it is a virtuous trait and worthy of acquisition to be cultured and implemented.

-Monika Kumari

यस्य नाहंकृतो भावो बुद्धिर्यस्य न लिप्यते ।
हत्वापि स इमाल्ँ लोकान्न हन्ति न निबध्यते ॥ १७ ॥

One who has achieved the true nature of the eternal connection to Supreme Lord Krishna, such a blessed one is not affected by material activities or influenced by worldly conceptions. Such evolved beings have resolved that everything is completely dependent upon the Supreme Lord who is sustaining and energising everything and is the sole is vara the controller of all existence. Thus one has no conceptions of I will do or this is mine or i will achieve, etc. and so forth.

-Aditi Patel

नियतं संगरहितमरागद्वेषतः कृतम् ।
अफलप्रेप्सुना कर्म यत्तत्सात्त्विकमुच्यते ॥ २३ ॥

niyataṁ saṅga-rahitam arāga-dveṣataḥ kṛtam
aphala-prepsunā karma yat tat sāttvikamn ucyate

Chapter 18, verse 23 from the Geeta:

The action which is devoid of fruitive desires free from attraction and repulsion, without attachment; which is performed as a duty is called the nature of goodness.

Reading the verse, I am reminded of an incident that happened a couple of weeks ago. It was around 9:20 pm, I had got down from BRTS at Sola Bhagwat. Being on the highway during night is risky because of lack of adequate lighting and the speed at which vehicles pass by. I managed to cross the road and was about to catch an auto when 2 old ladies came up to me and asked for help to cross the road. Immediately, I agree and dutifully helped them cross the road. They blessed me and moved on. The happiness I experienced from helping them cannot be substituted. I cannot define the nature of goodness, but can definitely say it dies exist very silently in all of us. Let us bring out the goodness without any expectations. For that is what its true nature is.

- Saikrishna H Vaidya

MIRAGE

-Saikrishna H. Viadya

'NO!' said the sculptor
Immerse in my imperfection
For perfection never stays
My piece has reached its last destination.

Gazed and gazed at the marvel
But wondered the young man
Of olds new denial
Enlighten Oh', wise my new inner human.

My timeless piece has all the time
To explain what I love all the time
But you have no time
To understand the Knocks that I time

Master, imperfection is what I try to find
Ney, I find purity
Knock my doubts that blind
Is there master any more clarity

Build yourself my friend,
For every piece is learning
And not the learners ultimate trend
That he glorifies as His king

Humbled, the young man bowed
To the beautiful statue that bestowed
Blessing in guise of sculptor
Art left his heart true remainder

Mirage never stayed
It was played
Your mind to the ultimate limit
Wake up! Always set a new limit.

Life Goes on...

-Kinjal Modi

Time has taken an air jet speed, School periods have turned into college lectures. 2 rupees berries & lollypops, Have changed to pizza's & burgers The school canteen treats now altered to Pizza Hut treatI don't remember when our school annual function & farewell party turned, to 31st party & dance party In school same monotonous uniforms were worn everyday, Whereas in college we wear different attires as per unique and colourful days.

This has all compelled me to utter" This is life and life must go on, With lot of histories and masteries, But we must enjoy every moment of life, Because it doesn't give us a second chance.

"It might happen that a year later Sitting on big conference table with a cup of tea, we again remember how college days were, Where friends accommodate on small table fighting for coke between them Signing with Parker we recall, that we were even borrowing a pen During assignment days when we discussed issues with our senior
On conference table, we became nostalgic remembering lectures with our professor
and
We again whisper,"Life goes on with lots of histories and mysteries,But being happy and positive is key of life So spread the fragrance of positivity Enjoy life and the joy is all yours.

A Moment Frozen In Times on...

-Amishi

There are moments in our life which can be described as perfect
These are the moments that we wish were frozen in time,
unable to be tainted by the cruelty and sadness
that this world can offer.....

And when the perfection of a moment passes,
It feels as if we have lost it forever
and in turn lost a part of yourself
And there's nothing scarier,
then thinking you will never find a way back to it

The reality is that,
the clock will tick each second
and that one moment we hold so dearly to our heart will not remain.
and if life teaches you anything,
we will learn that we will still face hardships and tears
and other moments we will wish that we can go back in time
to-that one moment where everything seemed so perfect
But we cant hide from life, because eventually
we are all going to have to live it
And as the perfect as a moment is, dont be afraid to let it go and face the
world and move forward in this tracherous journey of life
As appealing it is to have that one moment ,
where life made perfect sense,
and beautiful frozen in time remember
that there are more perfect moments lying ahead waiting for us
to overcome the challenges of life to make each moment worth it.

"The Sacred Human Body"

- Ms. Kaveri Purandhar

A Human body, beautiful creation of god...Multiple system that unanimously strike a chord...
How amazing is to know our brain.....That developes in the first five years with nerves and vein...Inorder to see,sense and listen to our beautiful nature...for ENT pathway god is the creator..

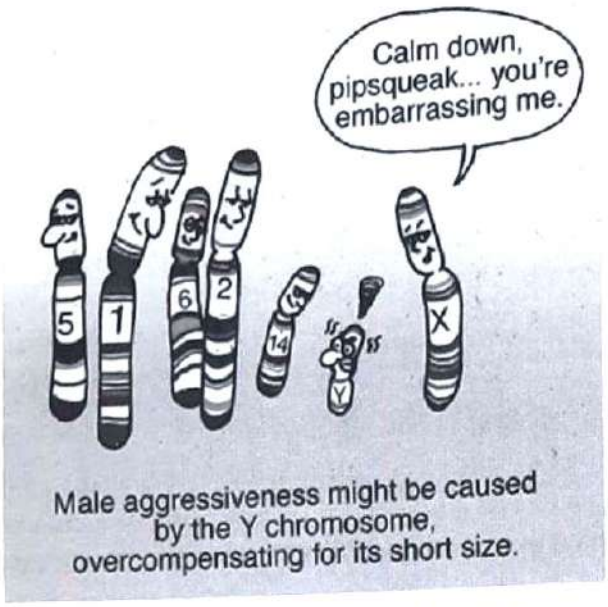
The mysterical complex mechanisms..
Wide research is on to decode these systems.Mere a 'Lub-Dub' of the heart says we are alive..Our digestive system because works wonders and is always on a high.

The complex world of reproductive biology...that amazingly gives rise to another human body.
Not very easy to understand the anatomy and the physiology...i am proud to do my research in reproductive biology

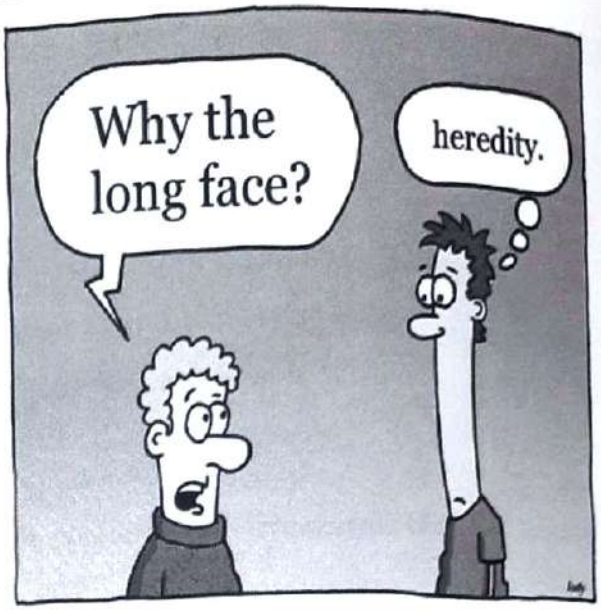
The arms and the limbs go hand in hand...
The boundless sensitive hormone system and the glands.
An amazing gift of god to a mankind...
A human spirit will nowhere bind

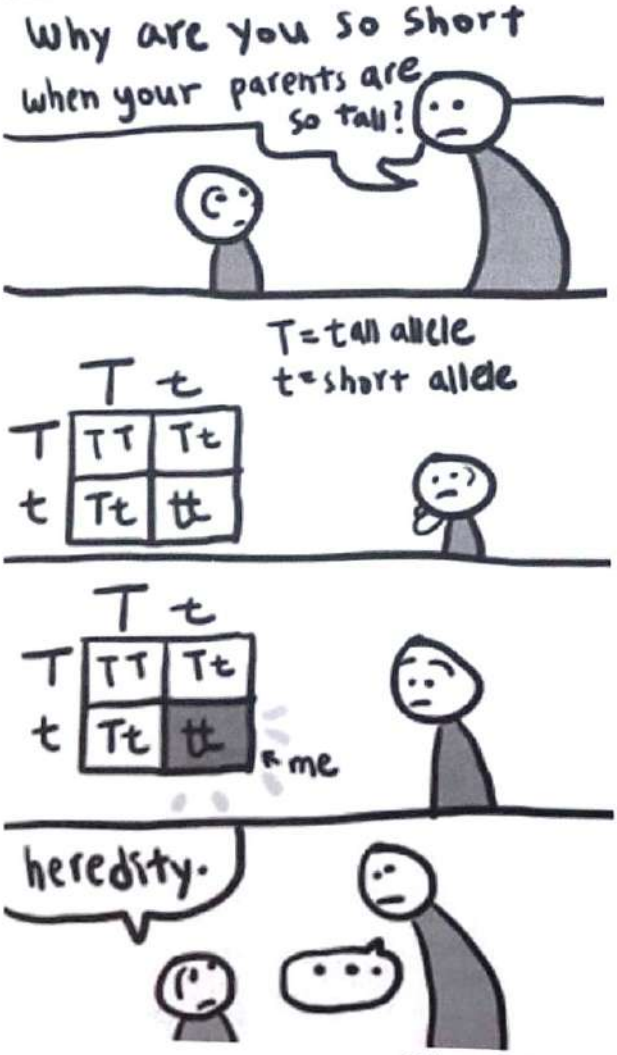
Lets cherish this gift on whole..
As Wisely quoted that
the "human body is the best picture of a human soul"...!!!
(Beautiful quote by Ludwig Wittgenstein)

Laugh over it !!

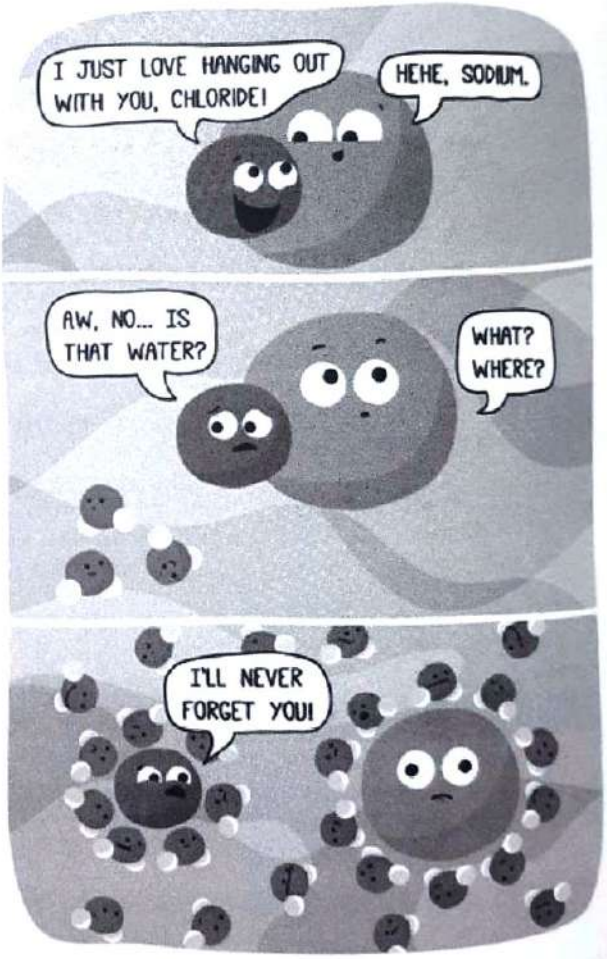


Male aggressiveness might be caused by the Y chromosome, overcompensating for its short size.





Divyesh kumar



GETTING DISSOLVED CAN BE TRAUMATIZING.

Beatrice the Biologist

Suhani

Do Social Networking Sites Really Help Us Socialise?

- *Kinjal P Modi*

It is said that, 'social networking sites help you socialize'. I would say it's a myth!

Well, have you ever come across people who are very shy and introvert when you meet them but are completely different in the online world? Don't you find it strange when you hardly know your roommate but are keen in inquiring things about your facebook friend who lives in London? Doesn't it sound really stupid when you can answer every minute detail about your favorite actor you follow on twitter, but you fail to know the favorite color of your mom?

Let's face it. This is the reality of todays so called "socializing".

The purpose of origin of these social networking sites has lost their relevance for which they came into existence. The life that is lead by our generation is cliché, we simply lack originality.

It makes me nostalgic for the good old days when our parents used to gather in large number with family and friends & celebrate festive occasions. But now the entire definition to "celebration & enjoyment" has been altered. We teens find joy not in gathering in large number & celebrating but by posting our festive-selfies & getting likes and comments from the unknowns. And accordingly to me this is not considered as a healthy change.

Social networking sites have popped up like 9 pins. Facebook, myspace, twitter, snapchat, pinterest, meetup, instagram, Friendster, hi5 & many more. You name it and you have it. And what do we do on these uncountable networking sites? We just end up expanding the number of people on our profile by meeting and adding our friends, our friends' friends, their friends' friends, and so on. With the advent of social networking, every individual from a 10 year old to a 55 year old have their profiles on these networking sites. A kid who is supposed to spend his childhood playing on the playground, competing with his friends and peers, learning lessons of life and preparing himself both physically and mentally to the challenges he is going to face once he enters adulthood is busy playing useless games like Farmville and candy-crush on facebook, which is not only killing his creativity and imagination but is also posing a severe threat to his health.

Also, creative discussions within the family & friends have been taken over by spending hours online, talking to the unknown in the name of social networking. And hence, these social networking sites are a big time waster and distracter.

Social networking sites reduce or eliminate face to face socialization. And teenagers are at a higher risk because of this, as instead of learning the art of interacting with others & build and maintain relationships face to face, we are busy in unfriending, unfollowing and blocking people, with whom we have disagreements. Just one click and your so called problems are over. We are not learning the art of resolving conflicts in the world outside internet. Believe me, it's hard to say no, be rude or ignore someone when you look them in the eye.

Also, because of the autonomy offered by the virtual world, individuals are free to create a fantasy persona & can pretend to be someone else. The convenience brought by the web has led criminals to understand that carrying out their trade is a much easier & less risky task online. Systematic rakets are run on social networking sites to defraud you. Character assassination is something which can be done very easily via networking sites. Cases of cyber bullying and crimes against children are increasing in large.

To an extent these social networking sites cannot be ignored. But their misuse and overuse is sometimes disgusting and depressing. Recently, my uncle posted a photograph of his newborn son on facebook and we all started congratulating and commenting on his post. But then we also come across situations where, one of my friends, uploaded a status conveying about the death of her grandmother, and then you find people liking it. And this is what is disgusting and depressing.

Some Amazing Facts about Mobile Phone

- A cell phone's camera can be used to see if the battery in your television's remote still has some juice in it. This works on remotes which use infrared LEDs to communicate with devices. The phone's camera can detect these infrared flashes when the remote is used

- In Britain more than 100,000 mobile phones are dropped down in the toilet every year

- In U.S., Engineers have developed ways to disguise mobile phone towers and antennae in which they install the equipment into telephone poles, clock faces, church roofs, signs and even mobile phone tower is often disguised as plastic trees

- More than 4 billion people own mobile phones. But only 3.5 billion use a toothbrush

- What is your monthly mobile phone bill? 142,000 pounds is the highest ever mobile bill by Celina Aarons

- Cell phones have zero effect on airplane equipment. It is the FCC (Federal Communications Commission) that doesn't want them to be used on airplanes. It is because when you make a call at 10,000 feet, the signal bounces off multiple available cell towers, rather than one at a time. This means too many airline passenger might clog up the networks on the ground

- Yuri Gagarin, the first human in space, returned to Earth by coming out from his space capsule at 7 km, parachuting down the rest of the way sans-ship, walking up to a farmer and daughter asking to use the phone to call Moscow. A wanted woman had such a sophisticated pattern lock on her android phone that the FBI was unable to crack it. They had to serve Google with a warrant so that they can help FBI

- Kevin Mitnick was a Hacker who was called the "most dangerous hacker in the world," spent 8 months of his prison sentence in solitary confinement because law enforcement officials convinced a judge that he could start a nuclear war by whistling into a pay phone. He listened in on FBI phone calls during the three years he evaded the FBI, left them doughnuts when he narrowly escaped raids and was chased down by a helicopter

- Telephonobia is the fear of making or receiving phone calls

- Nomophobia (no-mobile-phone phobia) is the fear of being out of contact either by your phone being lost, out of juice or out of signal range

- "Ringxiety" or "fauxcellarm" is described as a "psycho-acoustic phenomenon" when you hear (or feel) your mobile ringing when it's not

- Frigensophobia is the fear that using your mobile is damaging your brain

Apps College Students Should Own

- Urvi Vachetta

- Any.Do organises tasks. This application is perfect for students who need to create a to-do list, synchronize all tasks with other devices so that the list can be accessed from anywhere. You can add new entries to the list with the help of touch-based interface, or use your voice to create tasks. You can change the priority of your entry, mark a task as completed, or even shake your device to remove all completed tasks from it. The Any. Do widget can be added to your home screen for quick and easy access.

- Scribd helps students find millions of different documents and books that are important for studies. All those data are shared by people from all over the world, and one can easily organize them according to their topic.Create your own library with different notes, texts, and books that you need. Share them with your friends, and find all the information with Scribd.

- College students are so easily distracted from the studying process ! They can't live without social networks, they always need to check new photos of their friends on Facebook, or share their mood with the world during a lecture. To avoid such distractions, the SelfControl application has been created-it blocks certain websites that can distract you from studying and it does it for a set amount of time. So, when a lecture is finished, you are welcome to come back to your favourite websites again.

- TED is an application that has all business experts, educators, computer geniuses, music legends, and many other interesting people in it. You can have all the famous and most fascinating people in your phone now. High-quality videos of different conferences from all over the world can be accessed now with just a click.

- Mint.com helps college students having problems with money and even if you have enough savings, they always tend to disappear. Do not let this happen, and download control your budget and see what your money is usually spent on. With this app anyone can become more responsible.

- Sleep If U Can-With Sleep If U Can, you'll have to get out of bed and take a picture of your sink (or any other area you define) to turn off the alarm.

- RefMe-Doing research and writing a paper can be tiring, but it always seems like doing the references and bibliography is the worst part. Yet it's just as important as any other part of your paper. RefMe can help make the task a lot simpler. Often, you can just take a scan of the book or journal's bar code and get a nicely formatted bibliography entry, in one of 6,500 referencing styles.

Ask the author event

- Dhavan Sharma

Ask the author event

At the launch of sixth edition of book 'Molecular biology of the Cell', the Garland Science had organized an event named: "Ask the author". In this event, participants can ask a question to authors of this book : Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, Peter Walter. And if the question is selected the participant gets a personal copy of this book along with autographs of all authors. Students of first semester, INSTITUTE OF SCIENE had asked questions to Bruce Alberts as follows. They are simple, yet thought provoking.

Komal Patel asked...

In prokaryotic cell after every 10^6 generation mutation is possible, than is this possible in eukaryotic cell? If this is possible, than why eukaryotes are not mutated?

Dhavan Sharma asked...

How does the RNA polymerase only take ribonucleotides (not deoxyribonucleotides) from the pool of both ribonucleotides and deoxyribonucleotides present in the cell to make a RNA ?

Shreya Patel asked....

We say that mRNA strand does not exist indefinitely, it gets degraded after being translated. Then what is the mechanism behind it? Is their any signaling mechanism which causes its degradation at a point of time?

Happy Panchasara asked...

Oncogenes are present in all cells, but they get activated only in the presence of carcinogen. Since the cell divides it leads to repliction of these oncogenes too.Thus most of the cells possess oncogenes. Does this increases the probability of cancer in our body?

Makani Tejashwi asked...

Starting from the birth there has been many changes taking place by the genes in our body and due to which we developed various characteristics but since years and years ago humans have not yet evolved ....so how and what type of drastic genetic change occurred ...that made us a unique human being?????

Results were declared via a Youtube event on Nov 26th, 2014.

The winner was Manoj Kannon from BITS Pilani; had asked: "In the human body is that only tissue 'stem cells' that divide and replanish wornout cells or do differentiated cells also undergo mitosis?

If both of this happens how is the choice made in specific tissue type.

These questions may motivate you to find the answers just like it made us do.

Bibliometric Analysis of Faculty Publications of Nirma University

- *Jayshree Pandya*
Library Assistant, Institute of Science

Introduction: The Nirma University is a prestigious university having 7 institutes, viz Technology, Management, Diploma Studies, Pharmacy, Science, Law and Architecture. The present study is a bibliometric analysis of research publications of Nirma University from 1998 to till date. The bibliometric parameters including number of papers, number of citations received, productivity of journals, subject categories and authorship pattern have been used to carry out the analysis of the research contributions made by the faculty members of different institutions.

Objective of Study: The present study is undertaken to have an in depth study of the publication output of different institutes of Nirma University since the inception.

- Year-wise distribution of papers
- Institution-wise distribution of papers
- Domain-wise growth distribution of papers

Source of Information: The study has been carried out based on the publication data of Nirma University available in Web of Science (WOS). The query used for retrieving the list of article is " AD = ((NIRMA INST TECHNOL) OR (NIRMA UNIV SCI TECHNOL) OR (NIRMA UNIV) OR (NIRMA UNI))".The articles were then assigned to various institutes based on the affiliation information of the authors.

Results & Discussions: The study finds that a total number of 354 articles were published by different institutes of Nirma University as indexed in the WOS till 16th March 2015. The year-wise distribution of the articles published by various institutes is available in Table 1.

Year	Diplom	Law	Manageme	Pharmacy	Science*	Technolo	NA
2001						1	
2002						2	
2003						4	1
2004				3		5	
2005			1	9		6	
2006	1		1	6	2	11	
2007	3			19	3	4	
2008	3		2	16		4	2
2009*			1	11	4	7	
2010				13	2	8	
2011				21	5	11	2
2012	1			19	6	7	3
2013	1			38	10	5	1
2014*		1		35	9	17	
2015				2	2	5	
Grand Total	**9**	**1**	**5**	**192**	**43**	**97**	**9**

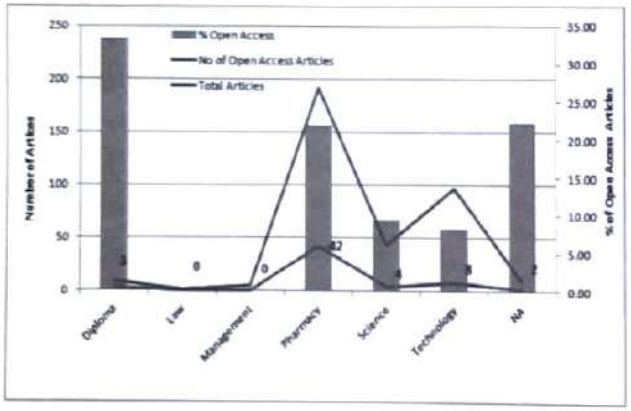
**One article is published by Pharmacy in co-authorship with Science in each year (2009, 2014)*

From among the 354 articles highest number of articles were published by the Institute of Pharmacy followed by Inst. of Technology and Inst. of Science. Among these articles 9 articles could not be assigned to any institute since no clear information about the affiliation of the authors was available. The above figures shows that there is an increase in the number of articles published each year. It may be noted that the no of articles in 2015 is lower than that of 2014 as the year has just began.

The distribution of these publications in various categories is available in table 2.

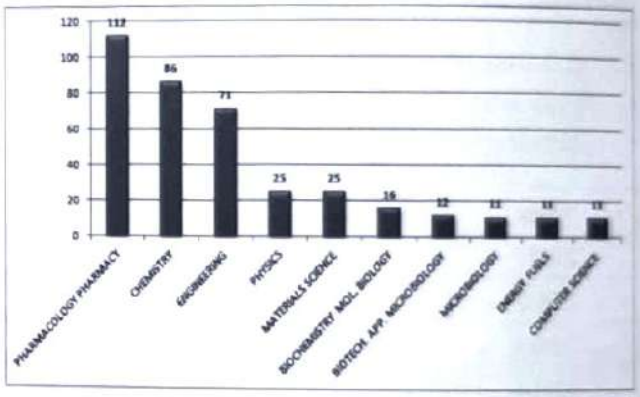
Category	Diploma	Law	Management	Pharmacy	Science	Technology	NA	Grand Total
Article	7	1	4	132	38	80	6	267
Article; Proceedings Paper	2					11		13
Correction			1					1
Editorial Material				4			2	6
Meeting Abstract				17			1	18
Review				39	5	6		49
Grand Total	**9**	**1**	**5**	**192**	**43**	**97**	**9**	**354**

The publication output were analyzed based on the publication preference in open access journals. The details of this analysis is available in figure 1.



above table shows that nearly 16.38% articles are published in open access journals with most articles published in open access from Institute of Pharmacy.

The publication output of various institutes were analyzed based on research areas. The top ten major research areas of research are as available in figure 2 below.



Publication Output Per Faculty:

The data was analyzed to find out the average publication per faculty for each institute. The total number of faculties per institute were counted based on the number of members enrolled in LMS (Koha) database. table 3

Average Publication per Faculty

Institute	No. of Faculty	Publication	Avg. Pub. Per Faculty
Technology	239	97	0.41
Management	53	5	0.09
Diploma Studies	45	9	0.20
Pharmacy*	26	192	7.38
Science*	11	43	3.91
Law	109	1	0.01
NA		9	
Total	483	354	0.73

** One article is published by Pharmacy in co-authorship with Science in each year (2009, 2014)*

As per the above table, the average publication per faculty comes to 0.73 fo the University. The institute wise average publication per faculty is highest for Pharmacy with 7.38 followed by Science 3.91.

The citations received by the research publications were analyzed to find the effectiveness of research papers of different institutes.

The citation count with average citation of the articles were given in table no 4 below.

Row Labels	Articles	Total	Average
Diploma	9	83	9.22
Management	5	6	1.20
Pharmacy*	192	1015	5.29
Science*	43	249	5.79
Technology	97	767	7.91
Law	1	0	0.00
NA	9	9	1.00
Grand Total	**354**	**2117**	**5.98**

** One article is published by Pharmacy in co-authorship with Science in each year (2009, 2014)*

The H-index for different institutions were also calculated based on the citations received.

The H-index for different institutions is given in table 4.

Institute	H-Index
Nirma University	**20**
Pharmacy	14
Technology	12
Science	9
Diploma	5
Management	1

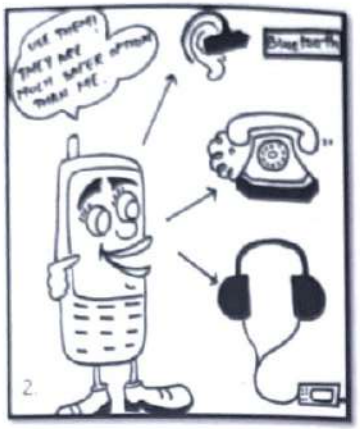
The H-index for Nirma University stands at 20 where as the H-index for Pharmacy, Technology, Science & Diploma are 14, 12, 9,5 and 1 respectively.

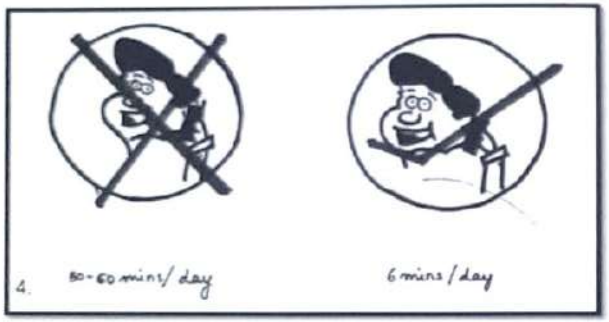
Conclusion:

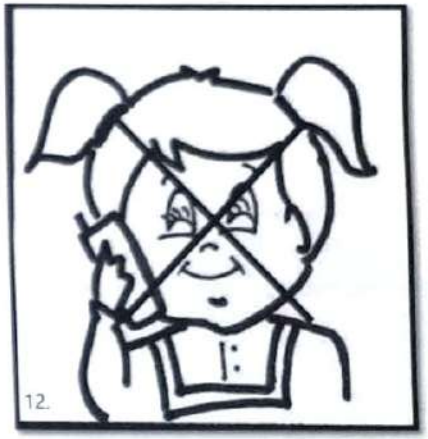
The above analysis shows that there is a increasing trend of publication output of Nirma University. The Inst. of Pharmacy produces the maximum number of publications followed by Inst. of Technology and Inst. of Science. It is also suggested that the faculties of the institute having low average article per faculty should be encouraged to publish articles in peer reviewed journals. The study also finds that the faculties are also interested in publishing articles in open access mode.

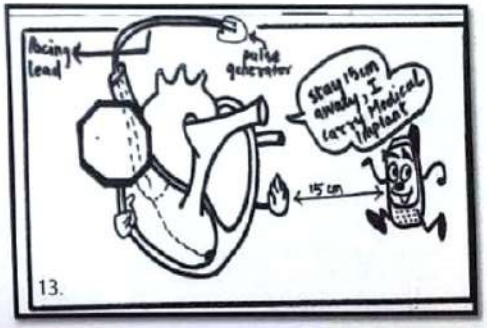
'Do's & Don'ts of cell phone use'

-Rajvi Patel









Precautionary Guidelinesfor Mobile Users

Mobile users are advised to take precautionary measures while using a mobile handset as:

1. Keep distance – Hold the cell phone away from body to the extent possible.
2. Use a headset (wired or Bluetooth) to keep the handset away from your head.
3. Do not press the phone handset against your head. Radio Frequency (RF) energy is inversely proportional to the square of the distance from the source -- being very close increases energy absorption much more.
4. Limit the length of mobile calls.
5. Use text as compared to voice wherever possible.
6. Put the cell phone on speaker mode.
7. If the radio signal is weak, a mobile phone will increase its transmission power. Find a strong signal and avoid movement – Use your phone where reception is good.
8. Metal & water are good conductors of radio waves so avoid using a mobile phone while wearing metal-framed glasses or having wet hair.
9. Let the call connect before putting the handset on your ear or start speaking and listening – A mobile phone first makes the communication at higher power and then reduces power to an adequate level. More power is radiated during call connecting time.
10. If you have a choice, use a landline (wired) phone, not a mobile phone.
11. When your phone is ON, don't carry it in chest/breast or pants pocket. When a mobile phone is ON, it automatically transmits at high power every one or two minutes to check (poll) the network.
12. Reduce mobile phone use by children as a younger person will likely have a longer lifetime exposure to radiation from cell phones.
13. People having active medical implants should preferably keep the cell phone at least 15 cm away from the implant.

Reference: www.dot.gov.in

Save the Girl Child

-Heta Rana

India is growing dynamically in every fields. Today, the boom in economy, innovative technologies and improved infrastructure has become nation's pride. The country has witnessed advancements in all fields but bias against a girl child is still prevailing in the country.

This social evil is deep rooted in Indian ethos and the most shocking fact is that the innovative and hard high end technologies are brutally killing the Indian girl child. Innovative techniques, like biopsy, ultrasound, scan tests and amniocentesis, devised to detect genetic abnormalities, are highly misused by number of families to detect gender of the unborn child. These clinical tests are highly contributing to the rise in genocide of the unborn girl child.

In today's day and age most couples prefer the process known as a planned pregnancy, because of various factors; prime amongst them being the financial well being to support the birth and nurturing of a child. In such cases, the first prenatal visit actually happens prior to actual pregnancy, to see whether one is ready to go off the contraception pills and conceive a baby.

However, in maximum conceptions, one is unaware of the pregnancy until actual realization dawns after one skips the first menstrual cycle. Normally doctors except ladies to pay their first visit anywhere between the sixth and twelfth week after conception.

Amniocentesis started in India in 1974 to detect fetal abnormalities. These tests were used to detect gender for the first time in 1979 in Amritsar, Punjab. Later the test was stopped by the Indian Council of Medical Research but it was too late. The benefits of these tests were leaked out and people started using it as an instrument for killing an innocent and unborn girl child. Many of the traditional women organizations also took up cudgels to stop this illegal practice but all failed and with the passage of time these tests became a major contributor to bias against a girl child.

Female feticide and infanticide is not the only issues with a girl child in India. At every stage of life she is discriminated and neglected for basic nutrition, education and living standard. When she was in the womb, she was forced to miss the moment when she was supposed to enter the world. At the time of birth her relatives pulled her back and wrung her neck. After killing her she was thrown into a trash can.

During childhood, her brother was loaded with new shoes, dresses and books to learn while she was gifted a broom, a wiper and lots of tears. In her teenage, she missed tasty delicious food to eat and got only the crumbs. During her college days, she was forced to get married, a stage where illiteracy, lack of education resulted in high fertility rate, aggravating the condition of females in the country. Again if this female gives birth to a girl child, the journey begins once again. She missed all roses of life and was finally fitted to a graveyard. That's where she got peace of mind.

The nation of mothers still follows a culture where people idolizes son and mourns daughters. UN figures out that about 750,000 girls are aborted every year in India. Abortion rates are increasing in almost 80% of the India states, mainly Punjab and Haryana. These two states have the highest number of abortions every year. If the practice continues, then no longer a day will come when Mother India will have no mothers, potentially, no life.

We all are proud citizens of India. The need of hour is to realize our responsibilities and give a halt to this evil crime. What can we do to curb the brutal and undesirable practice of mass killing girls? A determined drive can initiate a spark to light the lamp and show the world that we all are part of the great Mother India.

Interviewing Tips to Land You a Last Minute Summer Internship

- Surbhi Vyas

When spring rolls around, it finally hits you that the hours you spent binge-watching The Office as "research" did not get you any closer to landing a summer internship. During that lost time, your friends were out interviewing, landing killer internships. Yeah, you procrastinated on the whole being responsible thing, but if you avoid some of these cringe-worthy interview mishaps you may be able to score an internship in the nick of time.

1. Have a Little Interviewing Swag

The interviewer doesn't need to know they're your last chance at avoiding a painful summer of making overpriced frappuccinos. The moment you make an interview awkward with all your nervous antics you can go kiss your summer goodbye. Director of HR Strategy and Services at the University of San Diego shared how she has faced interviewees who've been so nervous they would profusely sweat or even start to shake. Take a little time to practice in front of a mirror or with a friend if that will calm you down. Do anything you have to in order to avoid handing the HR rep a sweat-smudged resume because it'll be in the trash the moment you leave the office.

2. But Don't Go Crazy

Many HR Department said, "The worst interviews have seen when people are over-confident. It comes across as condescending and disrespectful. There is no way they can know all of the nuances about an organization, so a little humility goes a long way." There's a difference between confident and cocky. If you are going to land an internship, you better figure out that difference—fast. Sure, you may have taken a few classes on the subject, but you're no expert. No company wants an intern with a know-it-all attitude. Dealing with that for a whole summer just sounds exhausting.

3. You Just Gotta Keep It Loose

Karen Oropeza, the Executive Assistant for the HR Department at USD said, "A lot of interview questions these days are the same—strengths, weakness, etc. When I ask questions like, 'What do you like the least about the job description?' or, 'Why should we hire you?' they are surprised and I generally get a candid answer." Interviewers don't want to hear the lame interview answers you memorized from a Google search. That freshman gen-ed acting class you took may come in handy, because being able to gracefully improve may be what lands you the internship.

4. Resumes Aren't Art Projects

My brother told a story about how a gentleman had included a picture of a robot in their resume. He was an engineer and had built this robot so he wanted to include it, but no way was it appropriate for a resume. Employers don't want a six-page, self-obsessed ode to your own accomplishment. People are narcissists; they couldn't really care less as long as you're qualified and personable, so keep the resume brief and get to the point.

5. You Called Nine Times?

Sure, it's nerve-racking to sit by the phone waiting to hear back about an interview. Pick at your split ends, inhale some Cheeze-Its and make a list of potential stripper names; just don't start harassing your interviewer asking for a status update. Christian Flynn, Human Resources Assistant at USD said, "Don't keep following up with an application. Maybe call once to make sure we received all your documents but past that don't keep calling us." Don't force them to start screening your calls. Sit tight and don't change from an enthusiastic applicant to obsessive stalker.

Numbers & Cosmos

- Mitali Singh

Mathematics education generally teach us numbers are quantities to count and calculate with. But it's quite a discovery to realize that they also represent qualities which we all innately understand -- wholeness, polarity, structure, balance, growth and more. These qualities are archetypal principles expressed in nature's forms and proportions of flowers, crystals, creatures, weather, astronomy and the designs of everyday technology surrounding us.

The Fibonacci Numbers form a sequence starting with 0 and 1, nothing and something. The rule is that each two numbers add to make the next, resulting in the famous Fibonacci Series: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ... The Fibonacci numbers are Nature's numbering system. They appear everywhere in Nature, from the leaf arrangement in plants, to the pattern of the florets of a flower, the bracts of a pinecone, or the scales of a pineapple. The Fibonacci numbers are therefore applicable to the growth of every living thing, including a single cell, a grain of wheat, a hive of bees, and even all of mankind.

Number 61 has in itself something interesting to note it is the number of discoveries. If we turn 61 upside down we get 19, the electromagnetic number and when we paste them together we get the year 1961 which is the year when Eightfold way theory organizing subatomic baryons and mesons was discovered. Also in 1961, the Nobel Eightfold path of buddism was allucidated and the nature of genetic code was discovered. This year was the time when man first travelled to the space. Also the size of the radius of the universe is 10 to the 61st power times of the Plank's length.

5, 8 and 24 the octonions, are a part of an eight-dimensional number system that was discovered in the mid–19th century. These are referrred to as 'The strangest numbers in the string theory' by mathematician John Baez. They provide the deep reason why the universe must have 10 dimensions: in 10 dimensions, matter and force particles are embodied in the same type of numbers—the octonions.

Number 128 is a physics constant and also the mirror image of 821 and they are both the core number that describe the particles and forces of universe. If we add all the numbers in 128 we get 11 ,as 11 is the dimension of our universe.Seven has always been a very special number. The Rig Veda, describes seven stars, seven concentric continents, and seven streams of soma. According to the Jewish and Christian Old Testament, the world was created in seven days and Noah's dove returned seven days after the Flood. Seven also has unusual mathematical properties, a beam of light spilts into seven colors.

The Universe exists as spacetime. Spacetime can be translated (within limits) into numerical/mathematical expressions and relationships. Hence, the Universe and events occurring therein may be expressed in numbers.

Uniparental Disomy; an Abnormal Situation

- *Shikha Tewari*
Research Fellow

"Uniparental disomy", an abnormal situation you can say; most of them are not familiar with. Humans body is made of cells. Cells have several linear chromosomes in their cell nuclei and each cell normally contains 23 pairs of chromosomes, for a total of 46. Twenty-two of these pairs, called autosomes, look the same in both males and females. The 23rd pair, the sex chromosomes, differs between males and females. Females have two copies of the X chromosome, while males have one X and one Y chromosome.

In humans, cells division has done by two procedures. 1. Mitosis i.e. is process by which chromosomes in a cell nucleus are separated into two identical sets of chromosomes, each in its own nucleus and occurs in somatic cell. 2. Meiosis i.e. the process that results in the formation of sperm cells and egg cells undergo meiosis to produce haploid cells, having one set of chromosomes, occurs in germ cell or reproductive cells. During fertilization, these haploid cells fuse to form a diploid offspring after the two meiotic divisions, only one member of each of the 23 chromosomal pairs is normally included in each germ cell. As a result 23 pairs of human chromosomes, one is normally inherited from the father and the other from the mother.

UPD as a concept was first introduced by Eric Engel in 1980. In which both members of a chromosome pair are inherited from one parent, and the other parent's chromosome for that pair is missing. UPD is for some chromosomes are without consequence, but for a few chromosomes can result in abnormality, in the affected individual through parent-of-origin differences in gene expression. Serious conditions, including syndromes affecting growth and development, can be the result.

UPD is classified as maternal or paternal, depending on the origin of the disomic chromosome. The reasons of UPD arise usually from the failure of the two members of a chromosome pair to separate properly into two daughter cells during meiosis in the parent's germ line i.e. nondisjunction.

Uniparental disomy usually arises due to an error in meiosis. Two chromosomes in either the egg or sperm cell fail to separate and both get passed to the fetus. The resulting abnormal gametes contain either two copies of a chromosome or disomic or no copy of that chromosome i.e. nullisomic, instead of the normal single copy of each chromosome i.e. haploid. This leads to a conception with either three copies of one chromosome i.e. haploid or a single copy of a chromosome or monosomy.

There are the few examples of symptoms of UPD which are listed below:

- Skeletal abnormalities
- Joint contractures
- Dysmorphic facial features
- Developmental delay
- Mental retardation
- Learning difficulties
- Concentration difficulties
- Respiratory abnormalities
- Polyhydramnios (excess of amniotic fluid in the amniotic sac)
- Oligohydramnios (deficiency of amniotic fluid)
- Short stature

UPD are of two types; i.e. Heterodisomy and Isodisomy.

When the child receives two (different) homologous chromosomes (inherited from both grandparents) from one parent, this is called a heterodisomic UPD. When the child receives two (identical) replica copies of a single homologue of a chromosome, this is called an isodisomic UPD.

Genetic Problems Related To UPD:

Uniparental disomy can result in:

- Phenotypical anomalies and disorders
- the loss of gene function which can lead to delayed development, mental retardation, or other medical problems.

When UPD occurs, the imbalance of maternal versus paternal genetic information for the involved chromosome can be associated with clinical symptoms in the affected child. UPD does not always impart an abnormal clinical phenotype however in fact, while isodisomy can result in disease due to a recessive allele at any location, heterodisomy is not expected to result in an abnormal clinical phenotype unless the involved chromosome or chromosomal segment includes imprinted genes.

The most well-known conditions include Prader-Willi syndrome and Angelman syndrome. Both of these disorders can be caused by UPD. For example; when maternal UPD 15 (2 copies of the maternal chromosome 15 instead of one maternal and one paternal copy of chromosome 15) occurs, it causes Prader-Willi syndrome due to the lack of paternally expressed genes at the imprinted site.

Other conditions, such as Beckwith-Wiedemann syndrome are associated with abnormalities of imprinted genes (silence genes). Maternal UPD accounts for approx 25% of Prader-Willi patients and paternal UPD for about 5% of Angelman syndrome patients.

Prader–Willi syndrome is a rare genetic disorder in which seven genes on chromosome 15 are deleted or unexpressed on the paternal chromosome. The variety of symptoms can range from poor muscle tone during infancy to behavioral problems in early childhood.

Recommendations on UPD testing:

The presence of two copies of a locus originating from one parent only and the absence of contribution from the other can be best documented by the use of DNA polymorphisms (DNA sequence variation occurring commonly within a population) For this analysis, DNA from both parents and the proband is needed in order to determine the parental origin of each chromosome. DNA-based, polymorphic markers (A genetic marker is a gene or DNA sequence with a known location on a chromosome that can be used to identify individuals.) should be utilized when investigating UPD.

Some important markers are Single nucleotide polymorphisms (SNP), Variable number of short sequence repeats (SSR) or microsatellites, variable number of longer repeats (VNTR) and Presence or absence of retro transposons such as Alu and LINE sequences.

50 Interesting Science Facts

- Bhumika

1 – The speed of light is generally rounded down to 186,000 miles per second. In exact terms it is 299,792,458 m/s (equal to 186,287.49 miles per second).

2 – It takes 8 minutes 17 seconds for light to travel from the Sun's surface to the Earth.

3 – 10 percent of all human beings ever born are alive at this very moment.

4 – The Earth spins at 1,000 mph but it travels through space at an incredible 67,000 mph.

5 – Every year, over one million earthquakes shake the Earth.

6 – When Krakatoa erupted in 1883, its force was so great it could be heard 4,800 kilometers away in Australia.

7 – Every second around 100 lightning bolts strike the Earth.

8 – Every year lightning kills 1000 people.

9 – In October 1999 an Iceberg the size of London broke free from the Antarctic ice shelf .

10 – If you could drive your car straight up you would arrive in space in just over an hour.

11 – Human tapeworms can grow up to 22.9m.

12 – The Earth is 4.56 billion years old...the same age as the Moon and the Sun.

13 – The dinosaurs became extinct before the Rockies or the Alps were formed.

14 – Female black widow spiders eat their males after mating.

15 – When a flea jumps, the rate of acceleration is 20 times that of the space shuttle during launch.

16 – If our Sun were just inch in diameter, the nearest star would be 445 miles away.

17 – Astronauts cannot belch – there is no gravity to separate liquid from gas in their stomachs.

18 – The air at the summit of Mount Everest, 29,029 feet is only a third as thick as the air at sea level.

19 – One million, million, million, million, millionth of a second after the Big Bang the Universe was the size of a ...pea.

20 – DNA was first discovered in 1869 by Swiss Friedrich Mieschler.

21 – The molecular structure of DNA was first determined by Watson and Crick in 1953.

22 – The first synthetic human chromosome was constructed by US scientists in 1997.

23 – The thermometer was invented in 1607 by Galileo.

24 – Alfred Nobel invented dynamite in 1866.

25 – Wilhelm Rontgen won the first Nobel Prize for physics for discovering X-rays in 1895.

26 – The tallest tree ever was an Australian eucalyptus – In 1872 it was measured at 435 feet tall.

27 – Christian Barnard performed the first heart transplant in 1967 – the patient lived for 18 days.

28 – An electric eel can produce a shock of up to 650 volts.

29 – 'Wireless' communications took a giant leap forward in 1962 with the launch of Telstar, the first satellite capable of relaying telephone and satellite TV signals.

30 – The Ebola virus kills 4 out of every 5 humans it infects.

31 – In 5 billion years the Sun will run out of fuel and turn into a Red Giant.

32 – Giraffes often sleep for only 20 minutes in any 24 hours. They may sleep up to 2 hours (in spurts – not all at once), but this is rare. They never lie down.

33 – There are 60,000 miles of blood vessels in the human body.

34 – An individual blood cell takes about 60 seconds to make a complete circuit of the body.

35 – On the day that Alexander Graham Bell was buried the entire US telephone system was shut down for 1 minute in tribute.

36 – The low frequency call of the humpback whale is the loudest noise made by a living creature.

37 – A quarter of the world's plants are threatened with extinction by the year 2010.

38 – Each person sheds 40lbs of skin in his or her lifetime.

39 – At 15 inches the eyes of giant squids are the largest on the planet.

40 – The Universe contains over 100 billion galaxies.

41 – Wounds infested with maggots heal quickly and without spread of gangrene or other infection.

42 – More germs are transferred shaking hands than kissing.

43 – The fastest speed a falling raindrop can hit you is 18mph.

44 – It would take over an hour for a heavy object to sink 6.7 miles down to the deepest part of the ocean.

45 – Around a million, billion neutrinos from the Sun will pass through your body while you read this sentence.

46 – The deepest part of any ocean in the world is the Mariana trench in the Pacific with a depth of 35,797 feet.

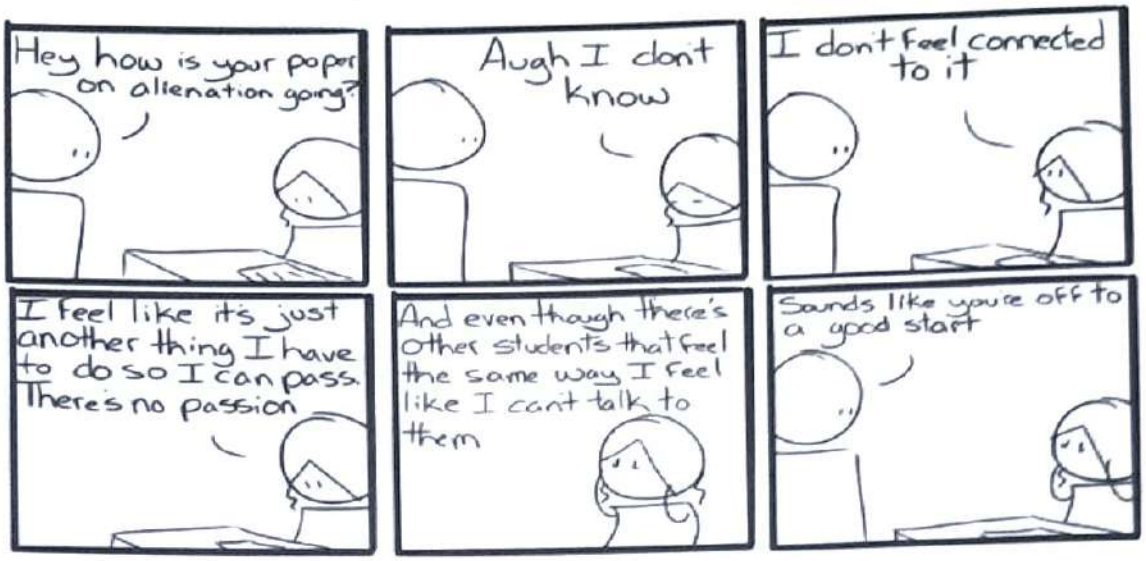
47 – Every hour the Universe expands by a billion miles in all directions.

48 – Somewhere in the flicker of a badly tuned TV set is the background radiation from the Big Bang.

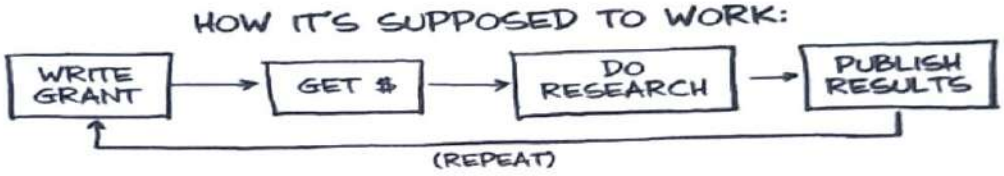
49 – Even traveling at the speed of light it would take 2 million years to reach the nearest large galaxy, Andromeda.

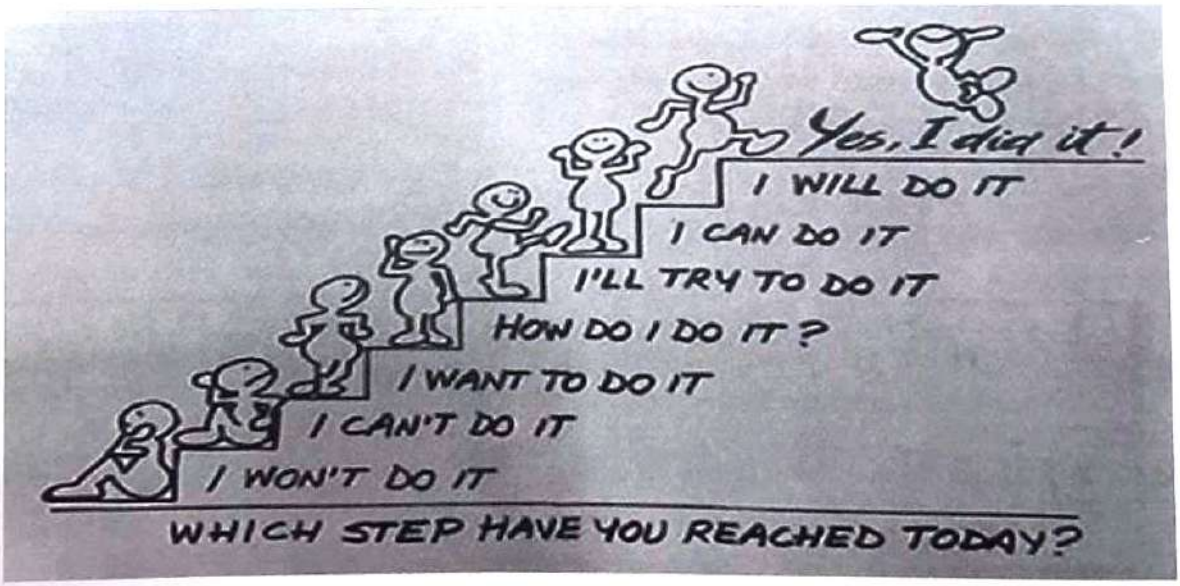
50 – A thimbleful of a neutron star would weigh over 100 million tons.

HAVE A HEARTY LAUGH



THE GRANT CYCLE





-Suhani

Modern vaccination strategies : Are we on the right path ????

- *Vishakha Bhurani*

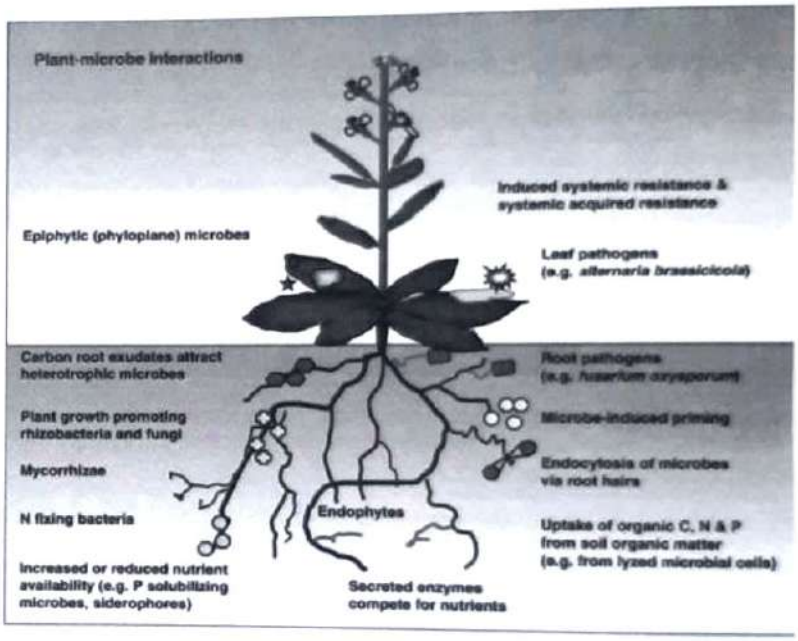
The immune system has a remarkable quality to fight reinfections which is conferred upon it by a specialized subset of lymphocytes known as memory cells. Generation of these memory cells is the goal of vaccination. Often achieving this goal has been a challenge, particularly for infections like HIV, Malaria and Tuberculosis. Vaccination is done to induce rapid, strong and heightened immune response while encountering the pathogen upon reinfection, however detailed kinetics of its formation and maintenance is yet to be fully understood. The type of memory (in terms of quality and quantity) is determined by an array of factors such as pathobiology, cytokines, involvement of various types of cells, level of inflammation, antigen dose and co-stimulatory molecules. All these factors contribute to creation of microenvironment that dictates the final outcome of immune response. Despite understanding of the role of above factors in determining protective response induced due to natural infection, most subunit vaccines have failed to achieve the desired goal. One of the possible reasons is that natural infection is not mimicked during conventional vaccine regimens.

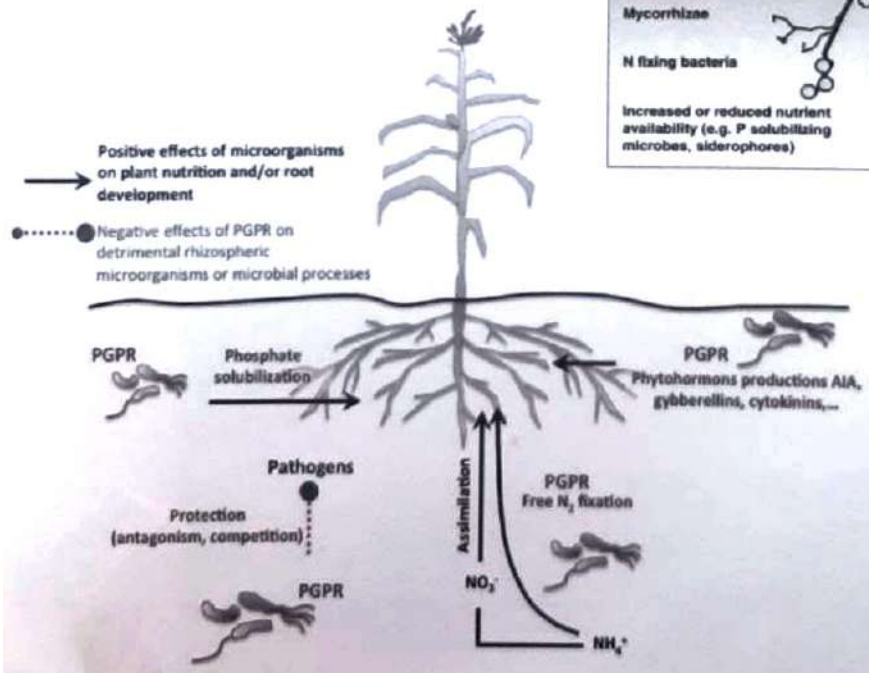
I paln to adopt strategy of natural infection by mimicking the different phases of course infection and also would like to understand the microenvironment created during these phases which modulates the immune response. I would like to use certain components of subunit vaccines along with adjuvants, in different combinations and study the immune responses. Thus I would like to vaccinate host in a manner analogous to that of natural infection and hope to generate multifunctional memory T cells. The knowledge of basic guiding principles of natural infections will help us to more closely and deeply understand basic concepts of immunology and would further allow us to design vaccine strategies more rationally for human use.

Rhizobia...a multipurpose PGPR

- Bhagya

PGPR, referred to as Plant Growth Promoting Rhizobacteria are a class of soil bacteria which influence or enhances plant growth by multiple direct and indirect mechanisms. Common PGPR include Enterobacter sp., Pseudomonas sp., Bacillus sp., Rhizobium sp. etc. Rhizobia are a class of nitrogen fixing bacteria which are known for their symbiotic relationship with legumes. They form nodules on the leguminous plant roots, inhabit there, fix nitrogen and provide plants with fixed nitrogen which is the most important macronutrient critical to plant growth. Though, nitrogen is present in abundance in atmosphere, plants cannot fix it to utilizable form. They require the help of nitrogen fixing bacteria to serve this purpose. Nitrogen fixation by rhizobia has been studied in detail since decades, however exploration of its other potentials are still in their infancy. Exploring other PGP properties of rhizobia in addition to nitrogen fixation can further aid plant growth by contributing to its biomass yield, increased nutrient availability, etc.





Induced systemic resistance against pathogen in plant

- *Ekta Joshi*

"ISR is indirect mode of action of PGPR and also it acts as biocontrol against the plant pathogen that causes the disease in plant". Disease depends on a close interaction among three diverse factors: (i) the host (crop, plant), (ii) The pathogen (bacteria, virus, and fungi), (iii) the environment.

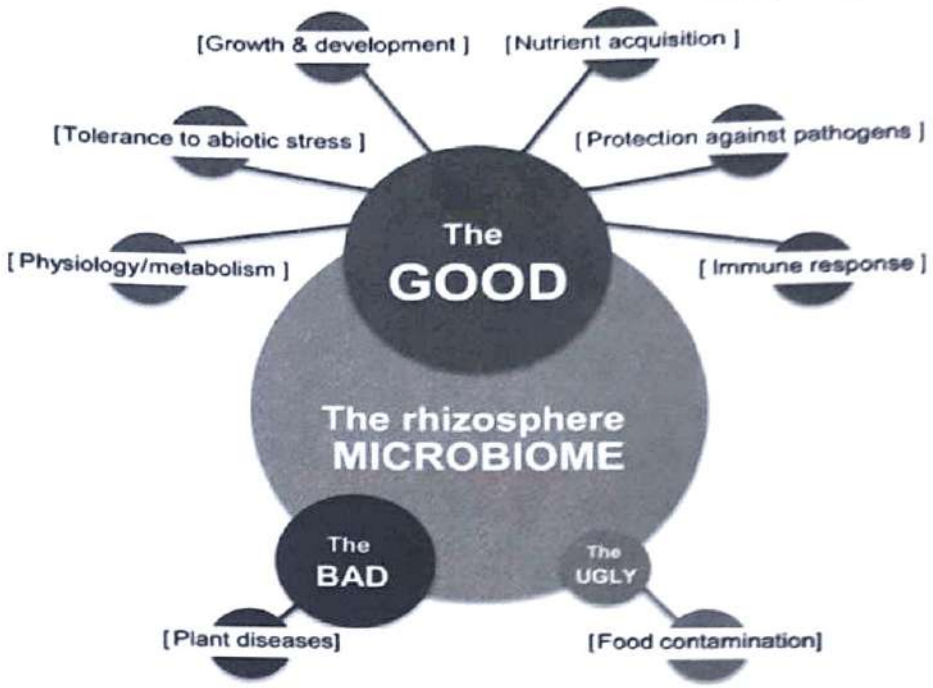
Induced systemic resistance (ISR) is dependent on jasmonic acid (JA) and ethylene (ET) signaling in the plant. Systemic acquired resistance (SAR) is dependent on Salicylic acid signaling in the plant. A combination of ISR and SAR can increase protection against pathogens. The salicylate- and jasmonate-induced pathways are characterized by the production of a cascade of PR protein which include: Antifungal compound (chitinases, glucanases and thaumatins), Oxidative enzymes (peroxidases, polyphenol oxidases and lipoxygenases. Salicylic acid, jasmonic acid and ethylene are involved in the plant hormones. It regulates by internal signals during development and in response to environmental stimuli from biotic (e.g., pathogen attack) and abiotic stresses, such as wounding, chilling, or freezing. SA activates specific sets of defense-related genes called pathogenesis-related proteins (PRs). PRs are produced after the attack of pathogenic microorganisms and also through wounding and necrosis inducing plant pathogen. In SAR pathogens attacks on plant SA produce a signal in case of ISR after attack of pathogens root colonizing plant growth promoting bacteria have able to produce JA and ethylene signal.

Transduction of the both signal requires the regulatory (activator) protein NPR1 (or NIM1) that functions in the terminal part of the signaling pathway of SAR and ISR. SA triggers the conversion of NPR1 into a monomeric form (Verhagen et al. 2006). These monomers are translocated to the nucleus), where they interact with members of the TGA/OBF subclass of basic-leucine-zipper (bZIP) transcription factors that are involved in SA-dependent activation of PR genes.

A direct interaction between NPR1 and a specific TGA transcription factor is required for the binding of the complex to elements within the promoter of the PR genes. Over expression of the NPR1 gene leads to enhanced resistance to pathogen attack. After the infection of pathogens signals (JA & SA) which are travels throughout the vascular system of the plant to activate defense response against the pathogen. ISR can be an effective control strategy against multiple pathogens. The resistant reaction resistance to fungi, bacteria and viruses. For developing transgenic plants through transferred SAR genes into plant genomes, In the near future, more such genes will be cloned and applied to agriculture. Resistance inducing factors include both biotic and abiotic ones.

Catabolite repression and P Solubilization

- *Mahendrapal Singh Rajput*



Rhizosphere is a complex biome at the interphase of plant root and soil. Several species of bacteria reside at this enriched but competitive juncture and play different roles like, plant beneficial ('The GOOD'), plant pathogenic ('The BAD'), and human/animal pathogenic microorganisms ('The Ugly'). The phrases 'The Good', 'The Bad', and 'The Ugly' are random as microbial species may be beneficial or harmful depending on its profusion (Maurhofer et al., 1992). This terminology is merely used for ease of description of the complex rhizosphere microbiome. 'The GOOD' ones, are also referred as PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) and they help plant in many ways. Several PGPR bacteria may help plant by supplying fixed N2 and some by solubilizing soil phosphorus for plant uptake. Nitrogen and Phosphorous are most essential requirements of all plants and these bacteria provide the same to plants. In turn, plant provides carbon sources in form of root exudates.

Free living nitrogen fixers with Phosphate solubilizing phenotype may serve as better PGPR for plant growth as it may serve plant with dual advantage of gaining fixed Nitrogen and soluble Phosphate. But some components of root exudates, like C4 acids (Succinic acid and Mailic acid) may repress P solubilization phenotype of such bacteria by mechanism of Catabolite Repression or Reverse Carbon Catabolite Repression and thus limiting their potential of plant growth. We studied P solubilization potential of free living nitrogen fixing Klebsiella and its catabolite repression by succinate at molecular level. Genetic variants or mutants with no catabolite repression may prove very good and efficient PGPR in field conditions without loss of phenotype by catabolite repression.

Proteins: a Few Steps towards Solving the Unsolved Mysteries...

- *Krupali and Palak*

Proteins are the major components of living organisms and perform a wide range of essential functions in cells like regulation of metabolic activity, catalysis of biochemical reactions and maintenance of structural integrity of cells and organisms. The linear sequence of the polypeptide chain contains all the necessary information to specify a protein's three-dimensional structure. Maintenance of the correct tertiary structure is of utmost importance for the protein's functioning. Even a slight perturbation of the structure just affecting the active site may lead to complete loss of the protein's function. Misfolding may also lead to aggregation of the protein leading to various diseases. The research focus of our lab has considerable socioeconomic relevance.

The broad research interest of the laboratory is in protein stability, protein folding/misfolding, aggregation and protein structure to function relationship. We use biochemical, biophysical and in silico approaches to address these problems.

We are presently working with protein aggregation and ways to prevent aggregation. Protein aggregation is associated with many human diseases like Alzheimer's disease, Parkinson's disease, prion disease etc., Hence identification of candidates with a potential to prevent aggregation or promote disaggregation of already formed aggregates, will help to alleviate some of the problems associated with protein aggregation. This research is funded by Department of Biotechnology, Govt. of India.

We are also predicting in silico, natural compound inhibitors for aggregation of proteins such as human islet amyloid polypeptide, alpha synuclein, amyloid beta peptide etc. by pharmacophore modelling, screening natural compound databases for active compounds followed by molecular docking.

The second aspect that we are presently working on is to understand the molecular basis of protein stability using extremozymes as model systems. Understanding the basis of protein stability can help us to design proteins with greater stability in terms of thermal, salt or pH tolerance. Increasing protein stability is a basic goal for both basic research and industrial applications. This has considerable importance in industrial enzymes, therapeutic enzymes as well as in biotechnology. We are also creating thermostable mutants of thermolabile enzymes by directed evolution with the same aim to understand molecular determinants of protein thermostability. This research is funded by Gujarat State Biotechnology Mission.

In keeping with the same objective of understanding the molecular determinants of protein thermostability, we are carrying out sequence and structural comparisons between mesophilic proteins and their thermophilic counterparts.

Development of novel compounds with new chemical scaffolds against novel enzyme targets is greatly fascinating. We are carrying out in silico studies on potential drug targets from various pathogens including molecular modeling, detailed analysis of structural elements, pharmacophore generation, structure activity relationship and molecular docking.

Strategies for Discovering Drugs from Previously Unexploited Natural Products

- *Chinmayee Joshi*

Multidrug resistance continues to be a serious global issue for reasons such as drug ineffectiveness, treatment failure and the appearance of various drug-resistant strains. Drug inactivation by microbial enzymes like β–lactamases and efflux of antibiotic from the cell are the various drug resistance mechanisms of pathogenic strains. In addition, biofilm formation, siderophore production and quorum sensing (QS) are the important virulence properties of certain drug resistant strains. Instead of using traditional strategies for the bacterial infections, it will be more significant to understand drug resistance mechanism and virulence properties of pathogens to develop potential drugs for specific disease.

Natural products are the most consistently successful source of drug leads. Despite this, their use in drug discovery has fallen out of favour. Natural products continue to provide greater structural diversity and biological diversity than standard combinatorial chemistry. As less than 10% of the world's biodiversity has been tested for biological activity, many more useful natural lead compounds are awaiting discovery. Advances in separation and analytical methods mean that active compounds can be isolated and identified rapidly from natural product extracts. Another alternative approaches are cloning and genetic engineering, offering the production of suitable quantities of natural chemical diversity. The range of accessible chemical diversity can be expanded by incorporating the appropriate metabolic pathways from unculturable organisms into convenient species. With the continuing need for novel drug-like lead compounds against an increasing number of ever-more challenging molecular assay targets, the chemical diversity derived from natural products will be increasingly relevant to the future of drug discovery.

Insulin: Beyond Therapeutic Agent for Diabetes Mellitus and Peripheral Hormone

- *Madhvi*

Recent research has suggested that insulin plays an important role in a number of brain functions, in addition to regulating blood sugar. Insulin is essential for the uptake of glucose by the cells of various tissues of the body and the brain tissues are no exception. Insulin receptors are abundant in the brain. Actually, they are found to be specifically expressed in the regions of brain that are concerned with cognitive functions. Insulin also plays a critical role for neuronal energy metabolism. Like other cells in the body, neurons in the brain need glucose to fuel their activities. In fact, PET scans have revealed that when some parts of the brain are engaged in a demanding cognitive task, the neurons in that area metabolize a great deal of glucose. Within minutes of a meal, insulin is sent to the brain to help neurons absorb and use glucose. "In the brain, insulin has a number of roles to play. It promotes glucose uptake in the neurons of the hippocampal formation and the frontal lobes," areas that are involved in memory formation and cognitive tasks. Insulin also strengthens the synaptic connections between brain cells, helping to form new memories. In addition, insulin regulates the neurotransmitter acetylcholine, which plays an important role in learning and memory.

Insulin promotes cell repair and cell genesis, so the thinking is that it could actually modify the course of Alzheimer's disease, says lead study author Suzanne Craft, professor of psychiatry at VA Puget Sound and University of Washington. It also appears to protect against the toxic effects of beta-amyloid, the protein involved in the brain plaques associated with dementia. Insulin also prevents the formation of the toxic form of tau, a biomarker found in the cerebrospinal fluid of Alzheimers' patients. It is well known that insulin resistance is a characteristic feature of type 2 diabetes. The surprising fact is that insulin resistance is also evident in the brain tissues of Alzheimer's disease patients.

Studies have identified a reduced expression of certain genes during the early stages of Alzheimer's disease. They are none other but the genes that are responsible for the production of the hormones insulin and insulin-like growth factor and the genes that encode for the receptors of these hormones in the brain. These findings made the researchers suggest that Alzheimer's disease is a form of diabetes mellitus that selectively affects the brain.

From all the above-mentioned evidences, it is believed that insulin is therapeutic window against age related neurodegenerative disorders like Alzhimer's disease may exist.

Toll Like Receptors (TLR): An Emerging Contributor to Central Nervous System

- *Madhvi*

Neurodegenerative disorders account for a major problem to human health because Central Nervous System (CNS) has limited regeneration capacity of neurons. Apart from the conventional role of TLRs in immunity, their presence in the nervous system has provided a glimpse to interaction between immunology and neurology. The brain is regarded as immunologically privileged, and, as such, has been thought of as an organ where the immune response to antigens is not destructive to tissue or is suppressed. But the discovery that neurons express major histocompatibility complex class 1 (MHCI) molecules and, recently, the toll-like receptors (TLRs) is changing the way the field of neuroscience views and depicts that immune system plays in the CNS and contribute to neural homeostasis.

Proper development of the CNS requires the establishment of appropriate connections between neurons. This process is controlled by a balance between synaptogenic molecules and proteins that negatively regulate synapse formation and plasticity. Surprisingly, many of these newly identified synapse-limiting molecules are classic 'immune' proteins. In particular, MHCI molecules regulate neurite outgrowth, the establishment and function of cortical connections, activity-dependent refinement in the visual system, and long-term and homeostatic plasticity. But from immunological point of view MHCI molecules are well known for their central role in the adaptive immune system, where they present self and non-self peptides for immune surveillance.

The concept of immune privilege is not a new one and in the rapidly changing world of biomedical science is a factum that is undergoing conceptual change but like all historical dogma has a large basis in fact. So the question exists that if the brain is to be considered an immune-privileged organ why does it express MHCI and a large majority of the already discovered 10 TLRs and of what use is the activation of these receptors if they are to be only thought about as useful in an immune response?

TLRs are known to be expressed by innate immune response cells and to play a critical role in their activation against foreign pathogens. Recent discovery about TLRs is that they play an important role in the crosstalk between neurons and glial cells in CNS. Innate immunity in the CNS depends primarily on the functions of microglia which are important for the early control of pathogen replication, direct recruitment, and activation of the adaptive immune system required for pathogen recognition and clearance and also on astrocytes and neurons.

Microglias are key players of the immune response in the CNS. They are also resident innate immune cells so responsible for the early control of infections and for the recruitment of cells of the adaptive immune system required for pathogen clearance. In response to the appearance of multiple bacterial or viral TLR agonists, TLR-mediated signaling promotes the production of a variety of inflammatory mediators. However, activated microglia with TLR ligands also produce neurotoxic molecules such as proinflammatory cytokines, NO, reactive oxygen species (ROS), and peroxynitrite.

Thus it can be said that an efficient immune response is required for the defense against invading pathogens, an inflammatory response in the CNS may also lead to tissue injury and neurodegeneration. Among all TLRs an important contributor to microglial activation is TLR 4, known to initiate an inflammatory cascade in response to various CNS stimuli.

Thus it can be said that an efficient immune response is required for the defense against invading pathogens, an inflammatory response in the CNS may also lead to tissue injury and neurodegeneration. Among all TLRs an important contributor to microglial activation is TLR 4, known to initiate an inflammatory cascade in response to various CNS stimuli. TLR 4 detects lipo poly saccharide (LPS) on cell wall of gram negative microbes. In particular, LPS-activated microglia produce a large amount of glutamate, an important neurotransmitter but also a potent neurotoxin and LPS injection may activate TLR4 on microglia and is linked to oligodendrocyte injury. It has been reported that injury to oligodendrocytes and myelin as occurs in periventricular leukomalacia and multiple sclerosis.

Yet, the role of TLRs in the CNS extends well beyond controlling host-defense responses alone. Other cells in the CNS, including astrocytes and neurons can also express multiple functional TLRs upon activation. Primary murine astrocytes express a wide variety of TLRs, but at lower levels than microglia. TLR signalling in astrocyte can activate the production of a wide range of neuroprotective and anti-inflammatory mediators. Expression of TLR in neuronal development play important roles in tissue development, cellular migration, and differentiation; in limiting inflammation; and in mounting repair processes following trauma. Unlike microglia, TLR 3 is widely expressed in astrocytes and neurons.

Neurogenesis is the process by which new neurons are created from neural progenitor cells in the adult brain. It occurs in two major brain regions—the subventricular zone (SVZ) and the dentate gyrus (DG) of the hippocampus. The mechanisms for neurogenesis are emerging with time. Recent evidence suggest that neural progenitor cells also express TLRs. It has been proposed that since TLR2 is widely expressed in the brain, and in cells that express early neuronal markers, they may be involved in adult hippocampal neurogenesis.

A dysfunction of glial and neuronal receptors, which alter the cells sense of their environment, can lead to neurodegenerative diseases. Alzheimer's disease is one of them. It is a progressive neurodegenerative disease, characterized by progressive memory deficits, cognitive impairments, and personality changes. The histopathological hallmarks include deposition of β amyloid protein, neurofibrillary tangles, progressive synaptic dysfunction and, much later, neuronal death. β amyloid plaques are surrounded and infiltrated by activated astrocytes and microglia, which are believed to be the major source of local inflammatory components. Thus it can be said that β amyloid deposition and neurofibrillary tangles activate a potentially pathological innate immune response in the disease. It has been reported that mouse models with a TLR4 deficiency have an increase in insoluble β amyloid protein in the cortex, as compared to TLR4 wild type mouse models. Thus, factors that increase the microglial cell clearance of β amyloid , without producing inflammatory mediators, are candidates for the treatment of Alzheimer's disease. These results suggest that the TLR signaling pathways may be involved in the clearance of β amyloid deposits in the brain and that TLRs can be a therapeutic target for application in Alzheimer's disease.

Investigating the neurotoxic and neuroprotective mechanisms of TLR signaling in glial cells may be crucial for understanding their role in the pathogenesis of neurodegenerative diseases, and may pave the route for future therapeutic intervention. There is a scope of research to explore novel neuroprotective strategies that will reverse the extent and severity of injury in neurodegenerative diseases.

The unseen world - Amazingly Diverse

- Purvi

Microbes in nature are omni-present. They have been acknowledged for number of essential activities of ecosystems and its functioning. In my journey of learning, I have got opportunity to work on diversity of microbes present in wastewater treatment process. The process regarding what we all are unaware and probably least bothered about. I was lucky to come across types of organisms working for such important process without which we would not get the recycling of used water possible for domestic as well as agricultural and industrial purposes. As we all know it is never one organism that can perform all required actions for the mankind.

The nature has created number of species with varieties of capabilities. Studying those, revealed enormous types of morphologies I could imagine ever in my dreams. I have always been curious every night after my inoculation to see their growth on plates and I was amazed every time seeing their natural beauty in diversity. Putting it all in scientific words, the community of wastewater treatment plant contains different categories of organisms at different stages. The aerobic, mesophilic bacteria are working for removal of organic matter at aerobic treatment stage. In addition few numbers of fungi, yeast and Actinomycetes were also present. Different genera, varieties of species and such good tuning!!! Working together as community they could serve majority of functions of treatment plants but leaving refractory COD as a big question. It is not the size which matters, even the smallest of organisms on this Earth have taught us the beauty of team work, task which is not possible while working individually can be completed wonderfully in a team. Observing those all working in such good harmony have left a message to me for all in this beautiful world of sharing and helping survival of each other.

Role of Poorly Immunogenic Antigens in determining Immunogenicity of target Antigen to induce Protective Immunity

- *Aditi Mathur*

The goal of vaccination is to generate long-lived antigen specific memory T & B cells. Often we find that the immune responses generated by the vaccines fail to achieve the desired goal, particularly the T cell responses. In many infection models it is well established that long-lived memory T cells could be generated in hosts exposed to pathogens through natural infection. Here we are adopting the strategies that would mimic natural infection with the hope to induce protective immune response in a manner similar to that triggered during natural infection. We would like to understand how inclusion of multiple antigens in a given vaccine formulation influence the generation of memory T cells to particular target antigen in the presence of PAMPs. In a given infection, host encounters many antigens from the pathogen, but develops response to selected Ag(s). While generation of effector T cell responses is studied in such cases, it is not clear how such condition shapes the generation of memory T cells. Similarly, co-infections do modulate the generation of memory to specific target Ag. Non-target Ags, depending on their nature of immunogenicity, might influence the generation of memory. Exploitation of the unique role of antigens would help develop novel strategies to generate long-lived protective immunity. Having a good understanding of these issues will encourage and pave path for developing new adjuvants and also for a clearer picture of our knowledge of basic immunology. In our study we will mimic natural infection to vaccinate the host by combining non-target Ag(s) with vaccine targets, while priming the host in the presence of danger signals.

Epigenetics and Environmental Determinants in Disease Etiology

- *Nazia Saiyed*

What is Epigenetics?

Epigenetics is the study of changes in gene expression without changes in DNA sequences and resulting phenotype of an organism. Changes in phenotype that are inheritable but do not involve DNA mutation.

A number of factors can influence the DNA methylation levels of a cell without requiring a change in genomic DNA sequence

- Aging
- Diet
- Environment

Our Changing Epigenome

- Epigenetic changes during our lifespan are caused by endogenous or exogenous factors.
- Endogenous factors include effects of genetic variation and developmental processes.
- Exogenous factors include a wide range of environmental factors.

Environmental cause of epigenetic changes:

- Toxins and endocrine disruptors

Lifestyle factors viz;

- substance abuse
- Delayed reproduction & assisted reproduction technology
- parenting behavior
- Epigenome also changes with aging

Developmental Origins & windows of sensitivity

Environmental factors exert their effects at particular times during development Periods of sensitivity viz;

- Oogenesis
- Spermatogenesis
- Preimplantation development and implantation
- Fetal life

Conclusion & future perspective: evaluating & managing our epigenetic risks

- There is a need to account for changes in ascertainment over time in order to monitor changes in prevalence.
- There is a need to define our life-long environmental exposures.
- There is a need to define how our genomes respond to all environmental factors at different times during life, with respect to epigenetic change.
- Exploiting individual genetic information, for example, in personalized medicine, will require knowledge of past and current environmental exposures, and current epigenetic states for maximum effect.

Biosensor Unique tool-for Monitoring of Wastewater

- *Rushika Patel*

The main universal solvent and renewable resource on Earth is water. One of these unique properties of water makes it get polluted easily. Monitoring of toxins, ecological pollutants, presences of hazardous chemicals, and pathogens precisely and quickly is a significant task in the field of environmental science, health care and homeland security, to achieve its minimum impact on the ecosystem and human society.

The detection of pollutants using chemical methods in the environment is expensive, time consuming process and chemical analysis fails to provide data related to the bioavailability of a pollutant, its effects on living systems, or its potential synergistic and antagonistic behaviour in waste water treatment. Microbial biosensors offer advantage over chemical methods and ecotoxicity testing using organism such as Defnia which detects toxicity of pollutants. Assays using microbial biosensors are rapid, sensitive, reproducible and cost-effective.

Microbial biosensors offer a simple and convenient method to measure the pollutant levels and are efficient tools in determining changes associated with complex inorganic and organic substances undergoing bioremediation. These microorganisms typically combine a promoter-operator and reporter gene(s). Promoter-operator acts as the sensing element and reporter gene codes for easily detectable proteins. These sensors have the ability to detect global parameters such as stress conditions, toxicity or DNA-damaging agents as well as specific organic and inorganic compounds. In addition, recombinant microbial sensors categorize in two groups; one in which bacterial strains are designed to sense individual organic or inorganic compounds and other which are tailored to report on group parameters such as toxicity or genotoxicity.

Advances of industries and techniques, population and its demand has left us with no option other then sustainable development for survival of creatures on this Earth. Biosensors would impart impactful beginning of new era of green revolution and I hope one day successful incorporation of biosensing equipment in waste water treatment will help automatization of the whole process and increase the treatment efficiency.

The Autism Enigma: Can a Gut Bacteria Imbalance Really Cause Autism?

- *Fulesh Kunwar*

Autism is a biological disorder coming from the brain that impairs people's communication and their social skills. Autism is a highly heritable and often severe neurodevelopmental disorder, with no biomarkers of disease and no pharmacological intervention for core symptoms. Autism is a complex neurodevelopmental disorder, marked by multiple symptoms that include atypicalities in: Social interactions, Verbal or Non-verbal communication and Repetitive behaviour. The phenotypic breadth of autism is encompassed by the term autism spectrum disorder (ASD).

Important new bacterium related to autism: Clostridium difficile, a microbe that causes GI symptoms, including diarrhoea and can account for problem in autism. The superbug can infect patients after antibiotics kill healthy gut bacteria. Desulfovibrio, one of the Proteobacteria, might also be important in autism because it was seen with some frequency; about 50% of patients with autism but not at all in any of the controls. Now, Desulfovibrio, as the name suggests, changes a sulfate compound such as a hydrogen sulfate. It desulfates them and you end up with hydrogen sulfide rather than sulfate as the principal end product of that metabolism which is a major toxic compound. Also, the cell wall of this organism, Desulfovibrio, contains a potent endotoxin, and endotoxins are known to be very damaging to people and animal models as well.

What are the reasons to wonder if this condition might be somehow "infectious"?

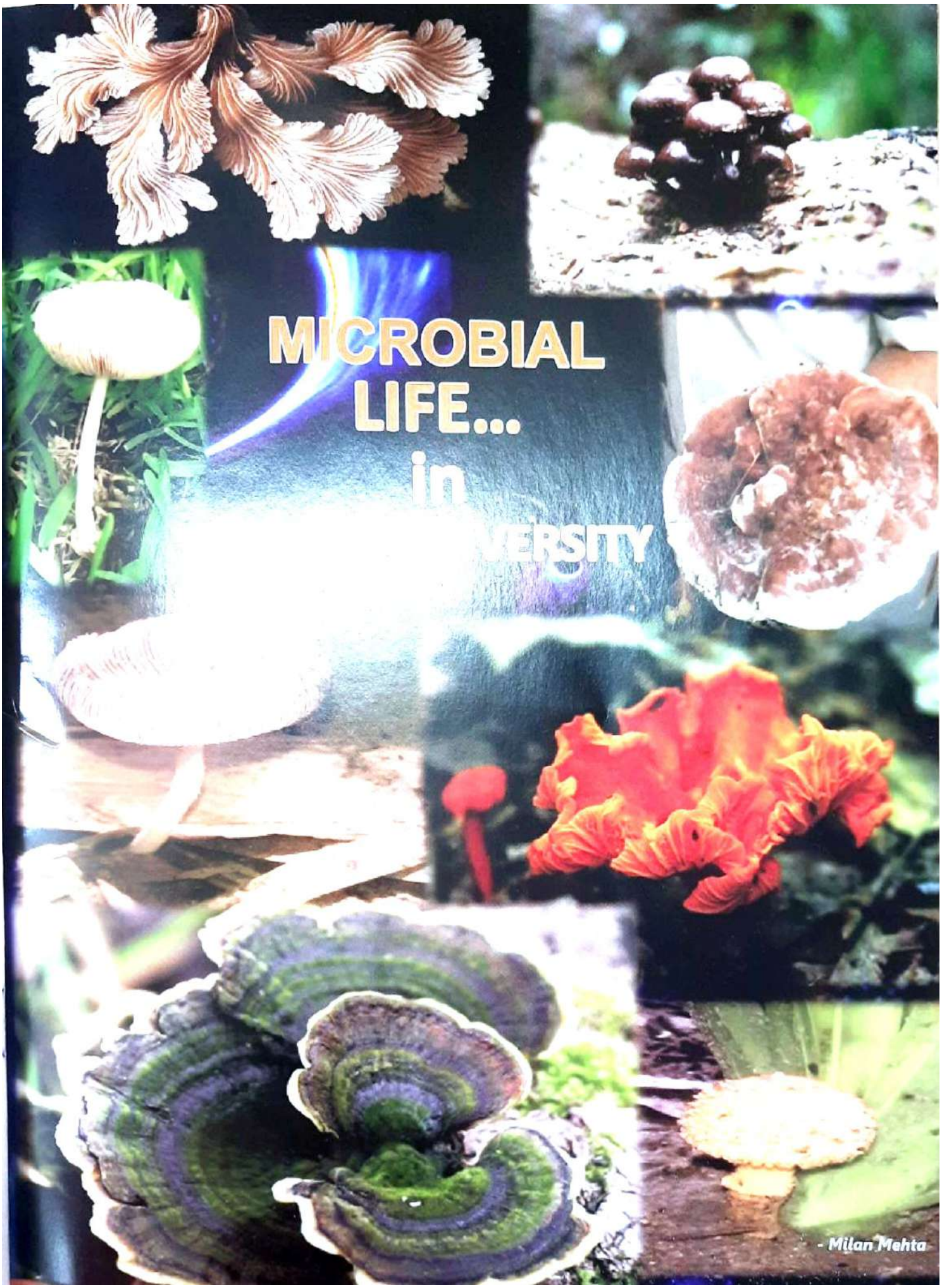
How these diseases spread from one to another and why the incidence of autism should be increasing so much?

Patients acquire Clostridium difficile, when the organism contaminates the environment of a hospital, it's a big problem and accounts for spread from patient to patient. Clostridium difficile, when it's exposed to antibiotics, tries to protect itself.

It does this by converting the ordinary vegetative bacterial cells into the spore form where they can withstand anything short of autoclaving. So, it was demonstrated spores from Clostridium difficile on the floor of a hospital room that was cleaned after the patient left and left without patients in it for over a month, and were still able to culture C. difficile. Same sort of thing is going on in the case of autism, but it remains to be documented. With Desulfovibrio, that organism is not a spore-former, but it has other mechanisms, various enzymes that protect it from exposure to oxygen and to other deleterious influences. So, Desulfovibrio can live in the environment for months on end in its vegetative state until conditions are improved and it has the opportunity to survive and multiply.

Diet which will help autism: A gluten-free, casein-free diet, which is difficult to make, time-consuming, and expensive, but many autistic children improve to a degree (sometimes a significant degree) on that diet. There's also a specific carbohydrate diet, which is even more difficult to make and more expensive, which is helpful to other autistic children. Ellen Bolte's son, for example, did not respond to the gluten, casein-free diet, but did respond well to the specific carbohydrate diet.

Can it be reversible?: Children who have had it for even a year or so, within two to three weeks of antibiotic therapy are much better, and it's within the realm of possibility that we can maintain the improvement and take it all the way back to a totally normal child(mostly applicable in early age so needs early diagnosis).


MICROBIAL
LIFE...
in
ERSITY
- Milan Mehta

Be stubborn

Most of the important things in the world have been accomplished by people who have kept on trying when there seemed to be no hope at all
-Dale Carnegie

about your

All our dreams can come true-If we have the courage to pursue them
-Walt Disney

goals

Imagination is more important than knowledge. Knowledge is limited. Imagination encircles the world.
-Albert Einstein

and flexible

An investment in knowledge always pays the best interest
-Bejamin Franklin

about your methods

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