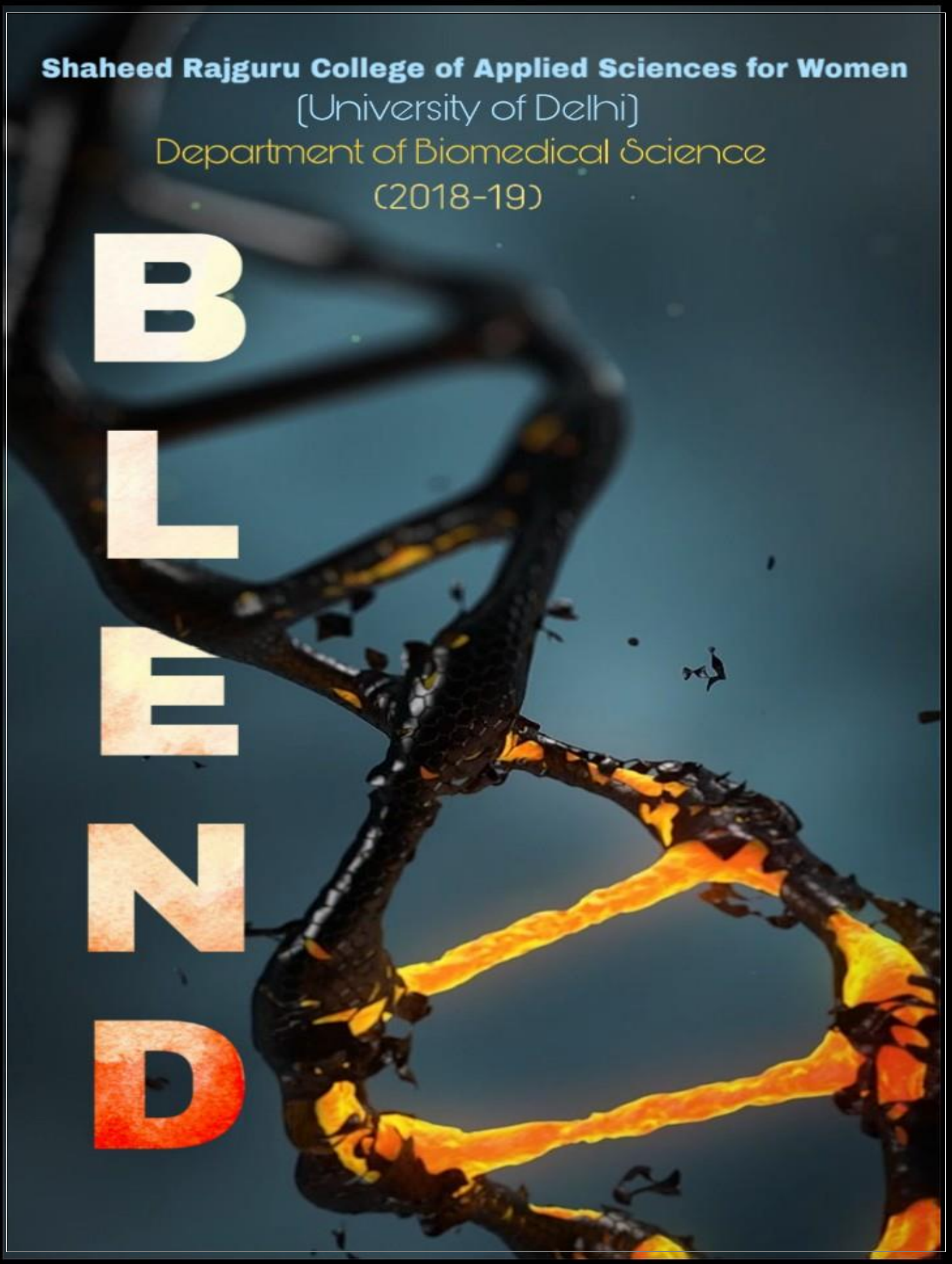
Shaheed Rajguru College of Applied Sciences for Women
(University of Delhi)
Department of Biomedical Science
(2018-19)

# BIND



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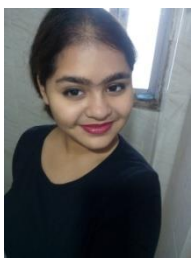

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# PRINCIPAL'S DESK

Nanotechnology, a science of extremely small is the enormously growing and developing scientific technology at present. It is an enabling technology with the potential to open up new vistas in the field of research and development. Since this new technology is around us with a huge impact in health care, Department of Biomedical Science has chosen this as the theme for their current year's e-magazine. I feel extremely proud to witness the launch of the first issue of this e-magazine "BLEND".

"BLEND" features various articles, interviews of young scientists and Sci-toons, science with cartoons. It also chronicles the events and achievements of the department as well as showcases the creating talent and writing prowess of the students.

I congratulate the entire editorial team for their tireless efforts and dedication in bringing out the first issue of e-magazine "BLEND" and wish them all the success.

Happy Reading!

**Dr. Payal Mago**
**Principal**
**Shaheed Rajguru College of Applied Sciences for Women**
**University of Delhi**

# FOREWORD FROM HOD


## Dr. Radhika Bakhshi

Assistant Professor,
Department of Biomedical Science,
ShaheedRajguru College of Applied Sciences for Women,
University of Delhi


***"Nanotechnology is an idea that most people simply didn't believe."***
***Ralph Merkle***

Like many scientific developments, nanotechnology was also thought to be unbelievable, but the present developments in this field have proved differently.

The students of Department of Biomedical Sciences have chosen a very appropriate topic**'**Nanotechnology and Health'for our annual issue of the magazine "**BLEND"**. The integration of nanomaterials with biology has led to the development of diagnostic devices, analytical tools, and drug delivery vehicles. Nanomedicine applies nanotechnology for treatment, diagnosis, monitoring, and control of diseases.

We are also celebrating our 14th annual inter-college technical festival, **'PLEXUS'** whose theme revolves around '**Diagnostics**'. We have been hosting Plexus since the inception of our Department of Biomedical Sciences in 2005. Eminent scientists are invited to enrich us and broaden our views to the new scientific dimensions. This year we are happy and privileged to have **Dr. B.C. Koner, Director, Professor of Biochemistry, Maulana Azad Medical College and Prof. FarhanJalees Ahmed, Dean, Interdisciplinary Sciences and Technology, Professor, Pharmaceutics, JamiaHamdard University**, to encourage and enlighten us in the field of Diagnostics.

Our departmental society, 'CHIMERA' has been working ceaselessly to organize this festival. A number of events have been planned to engage all the students in academic pursuit.

I would like to congratulate CHIMERA and the editorial team of BLEND for compiling such an informative and pleasurable issue this year. May they continue to pursue such excellence in the future issues as well.

# FACULTY SPEAKS

On occasion of 14th PLEXUS, the editorial board with cooperation of all students of biomedical science has put in untiring effort to bring out their e-magazine entitled "**BLEND**". I applaud their efforts for achieving this Herculean task. Today in this digital world scientific knowledge spreads at unprecedented speed and from this vast ocean of knowledge our students have tried to put together a few drops to quench their scientific thirst. Wishing all the best to outgoing third year students for bright and successful future.

**Dr. Shruti Banswal**

Yet another reason to celebrate, another edition of the much awaited annual magazine **BLEND'18** is out. My best wishes to all the students for the festival 'plexus' and the year ahead!

**Dr. Varsha Mehra**

I extend my heartfelt greetings to team plexus for organizing the much awaited event of the year. All the best!

**Dr. Saquib Ansari**

The much awaited event of the year 'Plexus 2018' is here again. Eagerly waiting to grab the next edition of the magazine 'Blend18'. All the best to all the students of team plexus.

**Dr. Indu Arora**

It is a proud moment that the Department has come up with its first e-magazine "**BLEND".** The diligent effort put in by the editorial team is commendable. I congratulate all the student contributors for their articles and wish all the very best.

Hope you all enjoy reading!

**Dr. Manisha Khatri**

I wish all the students to follow. The three P's of life are patience, persistence, and perseverance, for success in every aspect.

**Dr. Parvinder Kaur**

Learning is your superpower! Remember never stop trying & never stop growing your brain!

Wishing you all joy, happiness and good luck as you begin new chapter in your life. All the best!

**Dr. HemantKardam**

# MESSAGE FROM THE LAB STAFF

'Plexus 2018' is combined technical fest of 3 departments, which is a perfect platform for students to learn, and to show their abilities. Many Congratulations for the release of our first e- Magazine 'BLEND'. All the best!

# Editor's Desk

*Nanotechnology in medicine is going to have a major impact on the survival of the human race.*

***Bernard Marcus***



NEHA GUPTA ARUFI SINGH ANSHIKA KANSAL

It is simply fascinating to know that new and new discoveries are being made day by day. Arecent contribution to the field of biology is '**NANOMEDICINE**'. Being the students of anapplied science course and aspirants of the field of research, we scrutinized several areas till we came upon 'NANOTECNOLOGY AND HEALTH'. Humankind would have never imagined the application of nanotechnology i.e; the engineering of tiny machines (particles) to the prevention and treatment of disease.

**Nanomedicine** is the medical application of nanotechnology. **Nanomedicine** ranges from the medical applications of nanomaterials and biological devices, to nanoelectronic biosensors, and even possible future applications of molecular nanotechnology such as biological machines. Over the past years, researchers have been using nanomedicine to target microbes, with promising results in vitro and as a potential innovation to the field of antimicrobials. In the studies that followed, clinical trials started to appear, and it seems that a movement of clinical translation is initiating in the field of antimicrobial nanomedicine.

So here we bring our annual magazine of Biomedical Science department **"BLEND"**. It's been an absolutely fun and enlightening journey building this gripping read. Once inside, you will see mind blowing articles, very interesting sci-toons, self composed poems, interviews of great scientists, brain teasers and many more interesting things.

We would like to extend our gratitude to our teachers and the non teaching staff for their immense support and help. A lot of people take a lot of pride in creating this magazine. So, we would like to thank all the students who have contributed to the success of the magazine. We are obliged and grateful to our council team for their efforts in bringing our departmental magazine.

# EMINENT SPEAKERS ON PLEXUS

## Dr. Bidhan Chandra Koner

Director,
Professor Department of Biochemistry
Maulana Azad Medical College

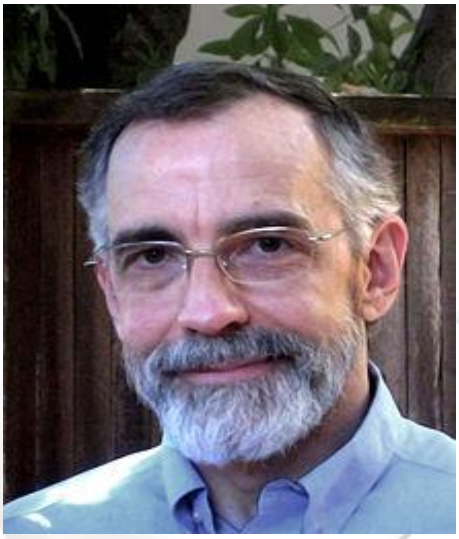
Dr. B C koner is currently working as a professor in Department of Biochemistry, Maulana Azad Medical College, New Delhi, India. He has published numerous research papers and articles in reputed journals and has various other achievements in the related studies. He has extended his valuable service towards the scientific community with his extensive research work.

## Dr. Farhan J Ahmad

Dean, Interdisciplinary Sciences and Technology, Professor, Pharmaceutics, School of Pharmaceutical Education and Research
Jamia Hamdard

**Prof. Farhan Jalees Ahmad** did his post graduation and Doctorate in Pharmaceutical Sciences from Department of Pharmaceutics, Hamdard University.

Dr. Ahmad has a 26 years of rich experience in Research and Teaching. He has experience of industrial research through his fruitful association with Ranbaxy Research Laboratories for six long years as Scientist. ***He is working in the area of Nanomedicine for the last 15 years and has published a number of research papers on nanomedicine in peer reviewed journals.***



# *K. ERIC DREXLER*

*He is a visionary scientist and engineer thought of as one of the "**Founding fathers of nanotechnology**", the science of engineering on a molecular level. He is most known for being the driving force behind the concept of molecular nanotechnology (MNT) and its potential benefits for humans.*

# ARTICLE SECTION

# Case study: South Africa uses nanotech against TB

**South Africa is using nanotechnology to improve existing tuberculosis drugs by incorporating the used antibiotics into the nanoparticles.**

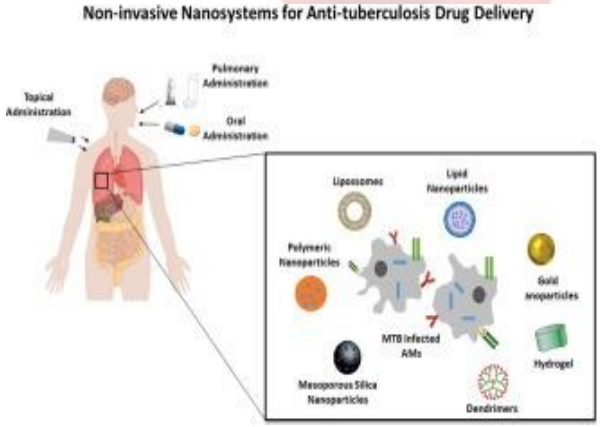
Treating tuberculosis (TB) in developing countries is a problem. Patients struggle to stick to the routine of taking daily tuberculosis medication for months on end particularly when they must travel long distances for a nurse to ensure they take the drugs. This and the side effects mean many give up before completing the course.

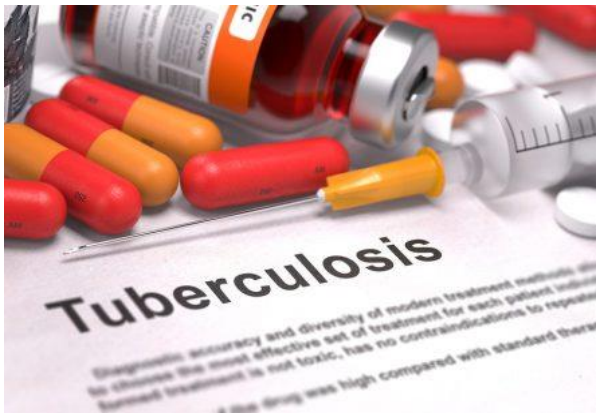
Lack of adherence means the 50-year-old drug regimen is failing as multidrug-resistant strains emerge. Chances are remote that it will be replaced anytime soon with new antibiotics.

But the days of clockwatching for TB patients may soon be over. Researchers in South Africa are working on a way to deliver that half-century old treatment in a new guise incorporating the drugs into nanoparticles so they are released slowly into a patient's bloodstream, raising the possibility that daily pills could be replaced with a single weekly dose.

Nanotechnology research is not cheap but researchers are hopeful that money spent on expensive research and development will be worthwhile when pitched against savings in treatment costs and substantial gains in health.

And those gains are there to be made. TB is one of the leading causes of adult death in South Africa with approximately 460,000 new TB cases in 2007, according to the WHO. South Africa is ranked fifth on the list of 22 high-burden TB countries in the world.



First-line of available treatment for TB consists of a pill of each of four antibiotics - isoniazid, rifampicin, pyrazinamide and ethambutol to be taken every day, and thus it is a cumbersome treatment.

South African scientists from the Council for Scientific and Industrial Research (CSIR) have incorporated these drugs into nanoparticles that are invisible to the human eye.

White blood cells take up nanoparticles because they look like foreign objects and, effectively, transport them throughout the body while releasing their cargo. "These nanoparticles have superior properties for absorption in the small intestine to improve bioavailability and uptake into the circulation,"

HuldaSwai,
Senior Scientist
CSIR's Centre for Polymer Technology

"Given savings as a result of lower dose and higher efficacy, the consequence of targeted delivery releasing drugs only after reaching the position required in the body treatments might actually become cheaper"

Bernard Fourie,
Chief Scientific officer of Medicine in Need
a non-profit research organization with a base in South Africa

The nanodrugs are designed to make use of cost-effective materials that are easily accessible and relatively cheap to manufacture." And because the technology is homegrown it will be less expensive to manufacture nanodrugs than to buy imported mainstream drugs.

Thus these nanodrugs for TB are of great importance in saving the lives of the people especially in a poor economy like SA. The potential advantages of the technology make its pursuit worthwhile. If TB treatment is reduced to a once-a-week dose, the overall costs, both of the drugs and of employing healthcare staff, could be significantly reduced.

Neha Gupta
BMS 3rd year

Nanodrugs, tailored for specific delivery to the lungs ie; they can attack the bacteria without affecting healthy cells around them.

**Nanotechnology** - The engineering of tiny machines

**Nanomedicine** - The application of nanotechnology to human healthcare

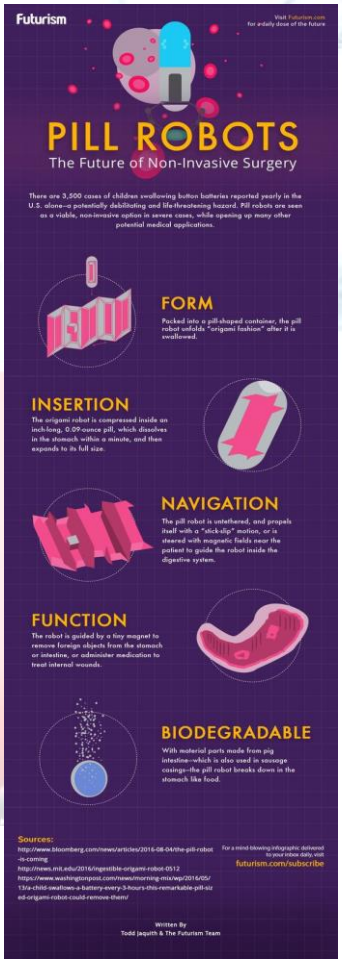
# Nanomedicine and Nanotechnology Facts

- One nanometer (nm) is one billionth, or 10 to the power of 9, of a meter.
- Nanotechnology is the engineering of functional systems at the molecular scale.
- Nanotechnology has provided the possibility of delivering drugs to specific cells using nanoparticles.
- Inhaling airborne nanoparticles and nano-fibers may lead to a number of pulmonary diseases, e.g. fibrosis.
- Nanoscale materials such as nano-pillars are sometimes used in solar cells which combats the cost of traditional Silicon solar cells.
- Calls for tighter regulation of nanotechnology have occurred alongside a growing debate related to the human health and safety risks of nanotechnology.
- Neuro-electronic interfacing is a visionary goal dealing with the construction of nano-devices that will permit computers to be joined and linked to the nervous system.
- Two forms of nanomedicines that have already been tested in mice and are awaiting human trials that will be using gold nanoshells to help diagnose and treat cancer.

ShrishtiAgarwal
BMS 1st Year

# Micromotor pills – a dynamic oral delivery platform

Using tiny micrometers/ nanoparticles to diagnose and treat disease in the human body is now a reality. But keeping these devices intact as they travel through the body remains a hurdle. Now in a study appearing in ACS nano, Scientists reports that they have found a way to encapsulate micromotors into pills. The pills coating protects the devices as they traverse the digestive system prior to releasing their drug cargo.




**PILL:**Researchers created a pill composed of a pair of sugars-lactose and maltose that encapsulated tens of thousands of micromotorsmade of magnesium/titanium dioxide core loaded with a fluorescent dye cargo.

Humera Khatoon

BMS 2nd Year

# Recent Discoveries

**1.** Nanoparticle technology has entered the forefront of cancer therapy due to its ability to deliver therapeutic effects while potentially passing physiological barriers. Key nanoparticles for brain cancer treatment include glutathione targeted PEGylatedliposomes, gold nanoparticles, superparamagnetic iron oxide nanoparticles and nanoparticle-albumin bound drugs.

**2.** The new lipid nanoparticle vaccine-delivery system could help to make effective vaccine formulations for a wide range of infectious diseases, and even give a boost to the development of cancer vaccines.

**3.** Nano therapeutics is now used in gene silencing in which small piece of RNA are deployed to shut down some disease causing genes.

**4.** HIV vaccine has been developed and is targeted using nano.

**5.**Nanotechnology may also increase the efficacy of pharmaceutical research. The targeted nature of nanomedicine reduces the time it takes for researchers to observe feedback on how cells respond to treatment. Experts suggest that testing flu treatments through gold-backed nanoparticles would bring immediate lab results and allow medications to be manufactured quickly.

Neha Gupta
BMS 3rd year

# FITNESS MONITORING

When you hear 'fitness monitoring' you probably think of the plethora of smartphone apps and the bracelets and wristbands that are on the market. Nanomaterials are going to open new realms of possibility for these monitoring gadgets.


Especially **graphene** could be crucial to wearable electronic applications because it is highly conductive and ultra-flexible. Possible applications could include:

1. In a hospital, a patient wears a printed graphene RFID tag on his or her arm. The tag, integrated with other 2D materials, can sense the patient's body temperature and heartbeat and sends them back to the reader. The medical staff can monitor the patient's conditions wirelessly, greatly simplifying the patient's care.

2. In a care home, battery-free printed graphene sensors can be printed on elderly peoples' clothes. These sensors could detect and collect elderly people's health conditions and send them back to the monitoring access points when they are interrogated, enabling remote healthcare and improving quality of life.

PiyaRawat
BMS 1st Year

# FLUORESCENT NANOPARTICLES CAN HELP IN TRACKING CANCER METASTASIS

Nanoparticles have emerged as potential tools for the diagnosis and treatment of cancer due to their selective accumulation in cancer tissue via enhanced permeation and retention (EPR) efect. Due to the potential benefits of nanoparticles in cancer, various multimodality nanoparticle platforms have been developed for cancer imaging using computed tomography (CT), positron emission tomography (PET), and single-photon emission computed tomography (SPECT). However, due to the lack of spatial resolution and low sensitivity, most of these imaging techniques fail to detect cancer at an early stage.

Cancer metastasis, when cancer cells migrate from their original site and take up residence elsewhere in the body, is estimated to cause 90 percent of cancer deaths. Ten percent of first-time cancer diagnoses involve cancer that has already metastasized, and between 20 to 40 percent of first-time cases will develop metastasis within five years of the original cancer diagnosis. One of the major challenges in developing precision-therapeutics for metastases is a lack of diagnostic tools that can track the small tumors that develop when cancer spreads.

Prabhas Moghe, Ph.D., professor of Biomedical Engineering, and Chemical and Biochemical Engineering at Rutgers University, and his team are developing nanoparticles that can help identify and track cancer metastasis early on, even when the tumor is incredibly small
The fluorescent nanoparticles, made of rare earth metals, are encapsulated by albumin, forming Rare-Earth Albumin Nanocomposites (ReANCs). The albumin, a protein commonly found in blood, makes the engineered nanoparticles safe in animals. These ReANCs are engineered to emit infrared light. Infrared light is invisible to the human eye but can be seen with special detectors and cameras. Researchers tested the ability of the ReANCs to track cancer metastases in mice implanted with human breast cancer cells. The cancer migrated to distant organs such as bone, lungs, and adrenal glands and the researchers were able to track the infrared signals from the ReANCs over the course of weeks. This allowed them to study where, and how quickly, the metastasized tumors progressed. The experiments showed that the ReANCs were safe and had completely cleared from the animal after 7 days.

Different targeted ReANCs could be combined in one injection — making it simple to illuminate of all the common sites of cancer metastasis at once. So far, the tests in mice have shown the nanoparticles to be more successful than both MRI and CT scans at identifying newly metastasized tumors in bones.
In addition to tracking the spread of cancer, the nanoparticles could potentially be used to differentiate cancer tissue from healthy tissue for surgeons who are removing tumors.

This technology could be positioned for use in humans within the next decade.

**Aishwarya rajan**
**BMS 2nd**

# NANOBIOTECHNOLOGY: A MEDICAL PERSPECTIVE

Nanotechnology is a novel scientific approach that involves materials and equipments capable of manipulating physical as well as chemical properties of a substance at molecular levels. On the other hand, biotechnology uses the knowledge and techniques of biology to manipulate molecular, genetic and cellular processes to develop products and services and is used in diverse fields from medicine to agriculture. Nanobiotechnology is considered to be the unique fusion of biotechnology and nanotechnology by which classical micro-technology can be merged to a molecular biological approach in real.

Biotechnology and nanotechnology are two of the 21st century's most promising technologies. Association of these two technologies, i.e. nanobiotechnology can play a vital role in developing and implementing many useful tools in the study of life.

**Advantages of nanobiotechnolgy-**

The pathophysiological conditions and anatomical changes of diseased or inflamed tissues can potentially trigger a great deal of scopes for the development of various targeted nanotechnological products. This development is like to be advantageous in the following ways-

1. Drug targeting can be achieved by taking advantage of the distinct pathophysiological features of diseased tissues

2. Various nanoproducts can be accumulated at higher concentrations than normal drugs

3. Increased vascular permeability coupled with an impaired lymphatic drainage in tumors improves the effect of the nanosystems in the tumors or inflamed tissues through better transmission and retention

4. Nanosystems have capacity of selective localization in inflamed tissues.

5. Nanoparticles can be effectively used to deliver/transport relevant drugs to the brain overcoming the presence of blood–brain barrier (meninges).

**Akriti Sharma**
**BMS 3RD Year**

# Maternal exposure to nano particulate titanium dioxide during the prenatal period alters gene expression related to brain development

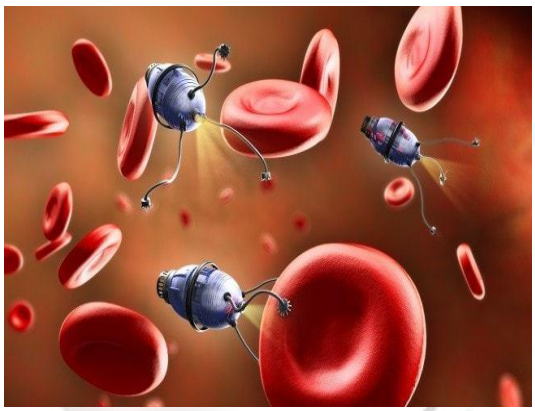
Nanotechnology and the production of novel man-made nanoparticles are increasing worldwide. Titanium dioxide ($TiO_2$) has a high level of photocatalytic activity.The activity level of nanoparticles is higher than that of bulk-sized particles. $TiO_2$ has the potential to produce reactive oxygen species (ROS) in its photocatalysis and its possibly detrimental health effects are of concern. It has been reported that a mixture of anatase and rutile $TiO_2$ nanoparticles induced cytotoxicity against human lung epithelial cells, even in the absence of photoactivation. Anatase $TiO_2$ nanoparticles, which can generate more ROS than rutile $TiO_2$ particles, exhibited a higher level of cytotoxicity.

Analysis of gene expression indicated that genes associated with apoptosis were altered in the brain of newborn pups, and those associated with brain development were altered in early age. The genes associated with response to oxidative stress were changed in the brains of 2 and 3 weeks old mice. Changes of the expression of genes associated with neurotransmitters and psychiatric diseases were found. Hence, it was concluded that maternal exposure to anatase $TiO_2$ nanoparticle caused the changes in the expression of genes associated with brain development and cell death.

*MONA YADAV*
*BMS 1st YEAR*

# NANOROBOTS

A **nanorobot** is an extremely small robot that is designed to perform specific tasks at the nanoscale. In **healthcare IT** industry, this technology brings a great boom & helps in protecting & maintaining the human body against viruses or bacteria. Researchers in **robotics** industry will use the pollution-free process to build cheapest & inexpensive nanorobots.



How Nanorobots Work? Suppose you visit a doctor for a common disease treatment, instead of giving treatment he/she sends you to a special team who implants small robots in your bloodstream. These robots will recognise the cause of your illness and provide a dose of medication directly to an infected area. It feels awesome when you got to know quickly about the cause of your problem. These robots are known as Nanorobots which greatly transforms the future of healthcare & eventually cure everything from cancer to haemophilia.

As per research theories, nanorobots will possess at least two-way communication. Through sound waves, these robots will receive power or even reprogramming instructions from an external source and will respond to acoustic signals. Special networks of stationery nanorobots will be positioned throughout the body which will keep the track of each active nanorobot passes & then report the results. Physicians or doctors could not only monitor a patient progress but can also change the instructions of the nanorobots in vivo to progress to another stage of healing. After treating, these nanorobots would be flush out of the body immediately.

**Applications of Nanorobots in Medical Field**

- **Treatment & Diagnosis of Diabetes:** To maintain the human metabolism, glucose molecules are carried through the bloodstream. To determine the need for injecting insulin inside the body, glucose monitoring nanorobots uses the chemosensor.
- **Dentistry:** For dental treatment, the nanorobots used are dentifrobots which induce desensitise tooth, oral analgesia, straighten irregular set of teeth.
- **Deliver the drug:** Nanorobots used for drug delivery is Pharmacytes which will transport the drug to the targeted point. The dosage of the drug will be loaded into the payload of the pharmacyte.
- **Surgery:** Surgical nanorobots can act as a semi-autonomous onsite surgeon will perform various functions such as diagnosing, detection of pathology, correcting lesions by nanomanipulation etc.
- **Cancer Detection & treatment:** Nanorobots are made up of a mixture of protein & a polymer known as transferrin which is capable of detecting tumour cells. These robots kill the cancer cells without damaging the healthy cells which will lead to hair loss, nausea etc.
- **Gene Therapy:** Genetic disease can be treated by nanorobots by comparing the molecular structure of both proteins & DNA found in the cell.

**Neha Gupta**
**BMS 3nd Year**

# स्व रचित कविताएं

# वाह रे इंसान तेरी क्या तारीफ़ करें !!

वाह रे इंसान तेरी क्या तारीफ़ करें

धर्म के नाम पे बच्ची से खेलना, खुद का तू अधिकार कहे

जुबां से भी कहो

नज़रों से भी करो

बच गया कैसे यह जिस्म ... इस झूठी मर्दानगी को तुम हमपे ही साबित करो

वाह रे इंसान तेरी क्या तारीफ़ करें !!

कहाँ गया वो समाज अब

छोटे कपडे पहनने से रेप हुए

अब तो यह बोलना बंद करो

लड़की की ही गलती थी

लड़कियों को नहीं लड़कों को घरों में बंद करो

वाह रे इंसान तेरी क्या तारीफ़ करें

तेरा खुद पे बस नहीं

वरना कोख में पल रही बच्ची का भी तू शिकार करे

रोती है तो रोने दो  लड़की है उसे हद में रहने दो

वो बेटी है बहन है किसी की

इससे तुम्हे क्या फर्क पड़े

धर्म के नाम पे तुम मिलकर रेप करो

वाह रे इंसान तेरी क्या तारीफ़ करें !!!

**Poonam Yadav**
**BMS 3rd Year**

**जब आया विज्ञान हमारे देश में**
**तो उन्नति का पंचम लहराया हमारे देश में**
**फिर इसी विज्ञान की शाखाओं ने राह दिखाया**
**आयी नई नई दिशाएं हमारे देश में ।**

**जीव विज्ञान है ऐसी शाखा , विज्ञान की**
**जो जीवो की ही जीवनी बताए संसार को**
**अगर होता ना ये विज्ञान तो कहां से आते ये महान अर्थात्**
**छाया था अंधेरा संसार में तो एडिसन ने लाया उजाला संसार में ।**

**जब हुए छोटे - छोटे छाले हमारे शरीर में**
**तो जेनर ने वैक्सीन बनाया 1796 में ।**
**और क्या कहे जीव विज्ञान की परिभाषा**
**जिसमे हो जीवो के जीव की आशा ।।**

**Supriya**
**BMS 2rd Year**



***science के छात्रों की ज़िंदगी ,***
***Assignment, projects और files में बंदगी !!***

**Biology में रत्ता मार**
**Chemistry में Chemicals की बोछार**
**और Physics में होता सबका भट्टा धार !!**
**$H_2O$ , $H_2O_2$ लगते दोनों एक समान ,**
**एक (O) का यह कमाल**
**एक से है ज़िंदगी तो दूसरी से है जान ।**

**Science के छात्रों की ज़िंदगी ,**
**Assignment, Projects और files में बंदगी !!**

**Enterance में होती उनकी ज़िंदगी तय,**
**Results का हमेशा रहता भय**
**और ऐसे चलकर उनकी ज़िंदगी में होती फतह !!**

**Science के छात्रों की ज़िंदगी ,**
**Assignment, Projects और files में बंदगी !!**

**Divya**
**BMS 2nd Year**

# ज़िंदगी

कभी कभी मैं समझ नही पाती ,
मुझे क्या सिखा रही है ज़िंदगी
हल्का सा जो दर्द है सीने में ,
वो संभाल रही है ज़िंदगी
कोरे कागज़ सी है दुनिया मेरी ,
जिसमे रंग भर रही है ज़िंदगी
अपना कहने वाले बदल गए अपने पराए का फर्क बता रही है ज़िंदगी
आँसू है जो मेरी आँखों में ,
वो पोछ रही है ज़िंदगी
खुद को कभी अकेला पातीं हूँ ,
तो मेरा हाथ थाम लेती है ज़िंदगी
जो तुम्हारा है वो मेरा नहीं जो मेरा है वह तुम्हारा नहीं ,
खुद के हक़ बता रही है ज़िंदगी
कुछ पल मैं रुकती हूँ ,
सोचती हूँ मुझे क्या समझा रही है ज़िंदगी

**Poonam Yadav**
**BMS 3rd Year**

# WHAT IT FEELS LIKE TO BE A SCIENCE STUDENT

*All along our naive schooldays*
*When Science is all fun and games,*
*The one subject that tickles our wits*
*And sweeps us away from the drowsy SST fits.*
*Growing up, confused of where life intends to take us,*
*"Science keeps all career options open", parents fuss.*
*Deceived by the façade elementary science puts forward,*
*"Choosing science in 11th" we announce, proud and honoured!*

*Thus begins our adventure around,*
*With our graph of grades and sleep going up and down.*
*Finishing Class 12 with flying colours was definitely a feat;*
*Not for too long, the future beamed at us as if to greet.*
*Suddenly everything revolves around lengthy reactions and pathways,*
*Books heavy enough to exercise with, a vast syllabus to gaze.*
*What keeps us going, you ask?*
*The delight of finally getting positive results of our cumbersome task.*

*The thrill of answering questions unexplored yet,*
*The beauty of rediscovering ourselves and the world is met.*
*Being an amalgamation of logic and reason,*
*Science constantly drives us to relieve our inquisition.*

*Being the creators of a new tomorrow,*
*With responsible hands, the yesterday we have to borrow.*
*As future scientists, researchers and scholars,*
*We'll certainly strive to become India's renowned daughters!*

**Snigdha Banerjee**
**BMS 2nd Year**

# INTERVIEW SECTION

Luckily we got an opportunity to have the presence of excellent **scientists** amidst us during the joint venture of **Translational Heath Science and Technology Institute and our college - Science Setu.**

They took out few minutes of their time to answer some of our questions and resolve our curiosity, glimpses of which are shared below -

**DR. SAMRAT CHATTERJEE, M.Sc., PhD**

Assistant Professor, at THSTI

Through mathematical modeling and data analysis, his research work is dedicated to understand biological problems.

**Q. How would you rate the level of research going in this field in India as compared to outside?**

**A.** If I have to compare between the two I would say we are not laid back but I would rather say we are late. See, in India mathematical modeling and data analysis in understanding biological problems, to identify the diseases and all this have gained importance now. We are working on it and we have almost all the essential resources that we require like the various software programs. But in countries like US it has been started in early 80's. Thus we are not less but late!

**Q. You must have faced some setbacks in your career with respect to your research. How did you overcome your problems?**

**A.** Yeah for sure! I think there is no one in the world who have never faced failures. Especially when you are in your PhD, you plan something but it's not always that you will get the result which you were expecting. So you have to change your track accordingly. To overcome your setbacks just keep focusing on your goal and stay positive. Also keep on motivating yourself. This for sure will help you to come out of your failures.

**Q. Sir generally biology students are a bit apprehensive of studying maths. How would you encourage the biology students like us to be more interesting in maths?**

**A.** I think choosing your research field and the subjects even in your graduation should be merely according to your own interest, then only you would be able to generate fruitful results.
But I really don't understand the fact that mathematics haunts the biology students! I have even seen people having double PhD in maths and biology related field. Trust me, this new approach of applying mathematical modeling in biology is really interesting and it's one of the very promising fields of the present as well as future. And I would really like more and more young people with innovative minds like you to take up this field and enjoy it.

**Interview by Neha Gupta**
**BMS 3RD Year**

**DR. DINESH MAHAJAN, Ph.D.**

Scientist E

Ph.D. in Synthetic Organic Chemistry

Dr. Dinesh is an experienced medicinal chemist and a drug discovery scientist. He has around 15 year of medicinal chemistry experience in academic and industrial setups.

**Q What made you so intrigued about medicinal chemistry that you decided to dedicate so many years in this field?**

**A.** Nice question. When I was in graduation, I read an article about a doctor where he mentioned various rare diseases that are neglected due to economical reasons .I found it very exciting and that article drew my attention towards medicinal chemistry. I was already doing chemistry honors and it was very easy for me to relate chemistry with medicinal chemistry. After I completed my PhD, I was offered a job from Ranbaxy as medicinal chemist. It gave me a real exposure in this field and that's how decided to pursue medicinal chemistry as a career.

**Q. India is considered as a hub for clinical research. How would you rate the level of research in drug discovery going on in India right now?**

**A.** Even though India is a hub for clinical research we still lag behind compared to other countries in drug discovery. Most of new drugs are invented outside India but are tested in India since it has a huge and diverse population. This makes India a top choice for clinical trials of the new drugs. Not only that, there are varied infections and diseases that are prevalent in India. For example, Tuberculosis is not very prevalent in United States. But most of the companies that are working on tuberculosis are US- based. Thus they conduct clinical trials in India. India still needs to produce many quality researches in this field to gain some momentum.

**Q. You are familiar with both academic and industrial setup. Which setup would you suggest for us, undergraduate students for training purposes?**

**A.** Not an easy question to answer. I would recommend to train in an industry first. This will give you an idea how to pursue a meaningful research that can be successfully translated into a product for the market. This will teach the students to work on a project with specific time and budget in mind, which is not the case with an academic research. Academic research is not focused on product development. It's more of a curiosity driven research. After I joined Ranbaxy as a trainee I developed all the above mentioned skills which are now helping me while I am working in academia.

**Interview by Arufi Singh**
**BMS 2nd Year**

**DR. SANJAY K BANERJEE, Ph.D.**

Scientist E

Ph.D. (Pharmacology): All India Institute of Medical Science (AIIMS), New Delhi, M. Pharma, Jadavpur University, Kolkata, India (1996-1998)

*HE* is an experimental biologist and molecular pharmacologist. His research interest is to understand the molecular mechanism of metabolic disease

**Q. Can you tell us what made you so intrigued in your field that you decided to dedicate so many years of your life into it?**

**A.** So basically when I was initially doing our bachelors and masters, I didn't get much exposure to research. But towards the end of my master's degree I got a six month project where I realized that there are lots of things which still need to be explored. Secondly, because my background was basically of pharmaceuticals, biology, drugs and all which made me realize that for various diseases or disorders we don't have any drug at all. I saw in books that there was no chapter of certain drugs. So ultimately realized that still lot of work has to be done via good people, good minds. So then I thought that it's a good noble profession in which I should continue if I get an opportunity.

**Q. how would you like to express yourself on the fact that you're associated with an institution which does the noble work of making drugs against diseases which do wonders for the mankind. How does that really make you feel about yourself?**

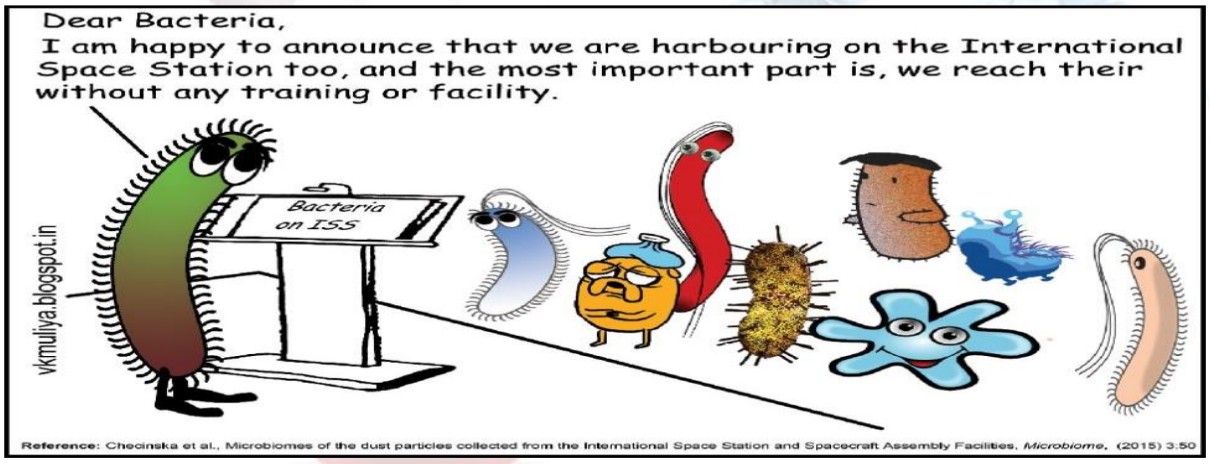
**A.** Yeah I think it's a good question, because that is the only thing we receive at the end of the day. When I do research, when I go home, before I go home I talk to my students and they show the data and results and that gives a lot of happiness. I think that is what which drives my research. So otherwise we don't have much other things like it is not money driven or it's not like any other encouragement you get, only own interest and happiness comes from your research.(smiles)

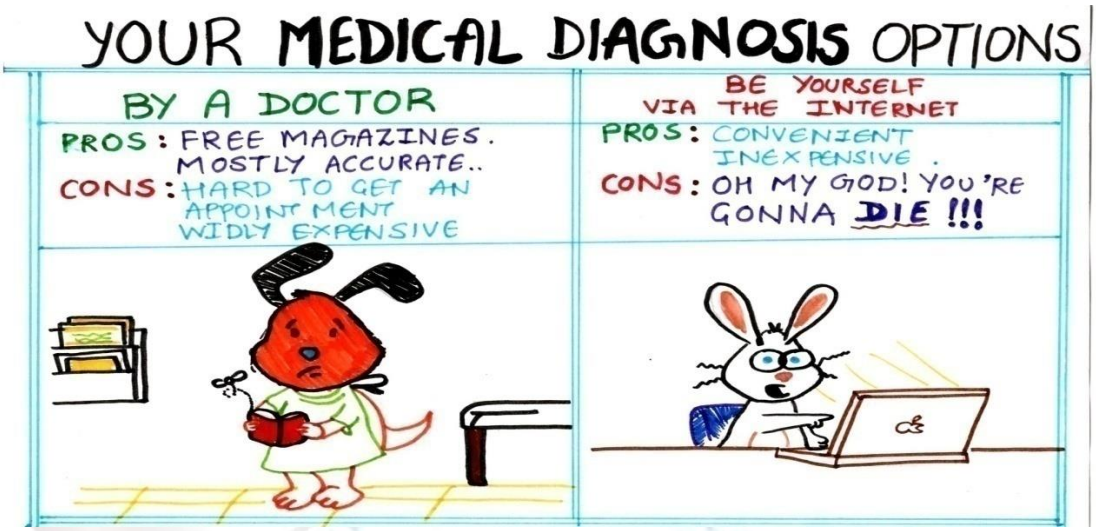
**Q. Lastly I'd like to say that being in a science college, doing graduation, most of us in some or the other way are inclined towards research. So what would you like to advise all young minds like us if we aspire to take up research in future?**

**A.** So I think firstly you need to study whatever the subject is or whatever the topics are there in your curriculum or courses and read like not only for passing the exam but to get basic understanding and knowledge of the concepts. Until and unless you don't have a basic understanding you cannot go to the next level. So it's not about marks but about knowledge which. And then never miss a chance if you get exposure to the practical or for at least a few days, opportunity at one of such places - could be academic institute, or industry or any hospital because you are biomedical students so you'll get exposure at hospitals also. This would really help in future if you take up research.

**Interview by Anshika Kansal**
**BMS 1$^{nd}$ Year**

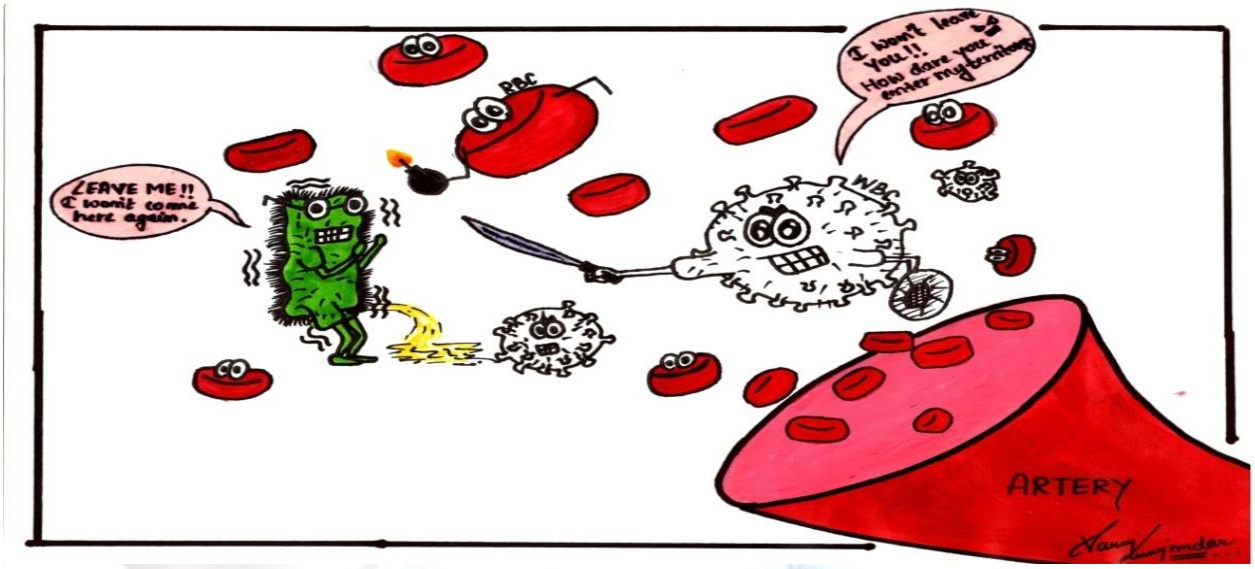
# Sci - Toons


Dear Bacteria,
I am happy to announce that we are harbouring on the International Space Station too, and the most important part is, we reach their without any training or facility.
Bacteria on ISS
vkmuliya.blogspot.in
Reference: Checinska et al., Microbiomes of the dust particles collected from the International Space Station and Spacecraft Assembly Facilities, Microbiome, (2015) 3:50



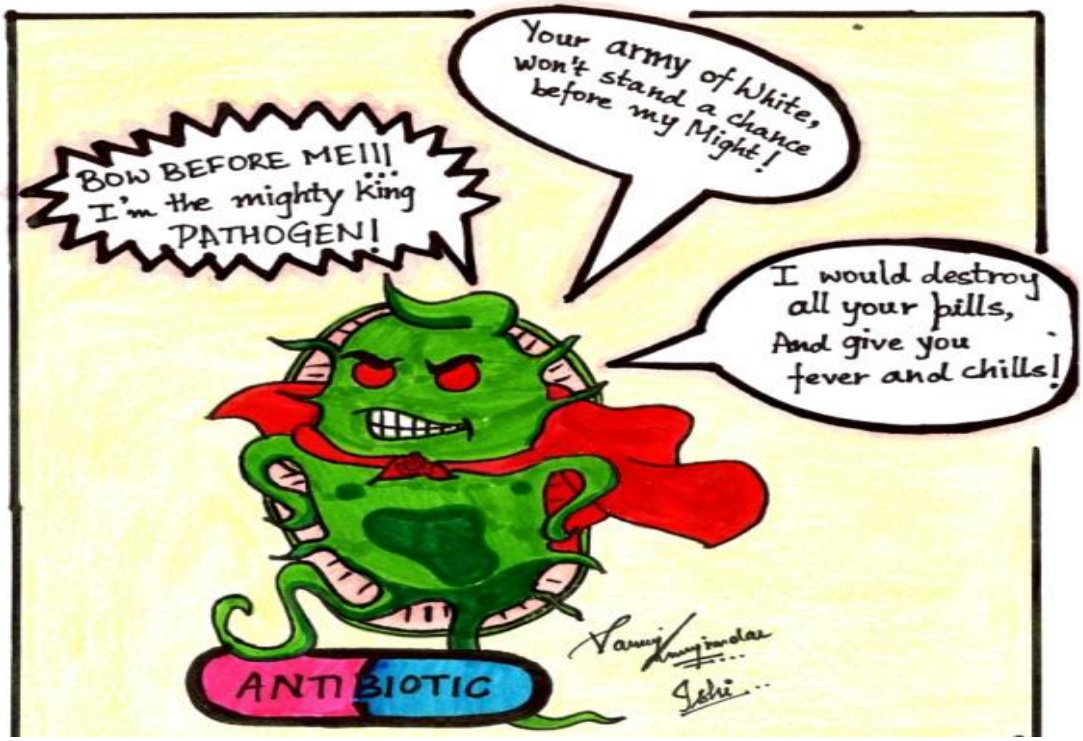


**Prajwali**
**BMS 2nd Year**

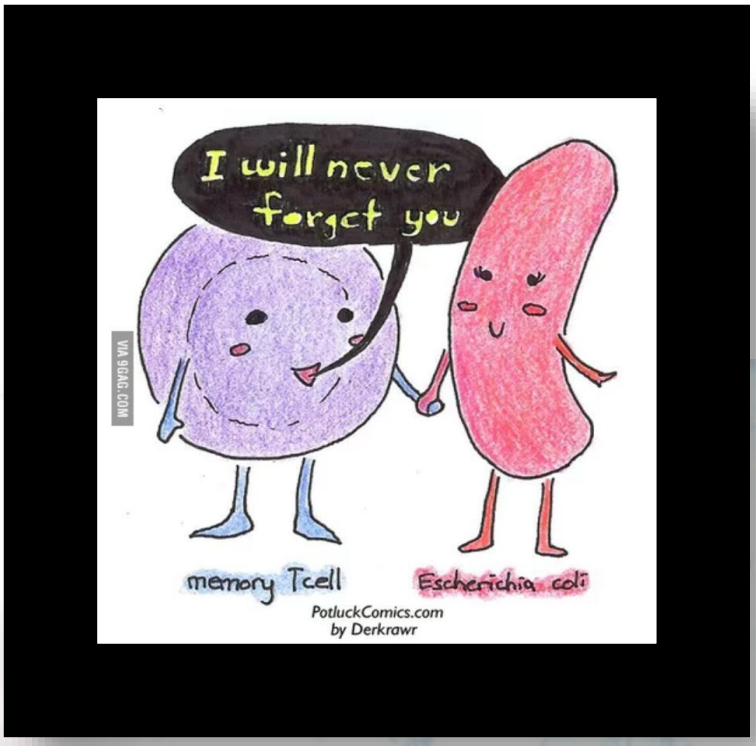

LEAVE ME!! I won't come here again.
RBC
I won't leave you!! How dare you enter my territory
WBC
ARTERY

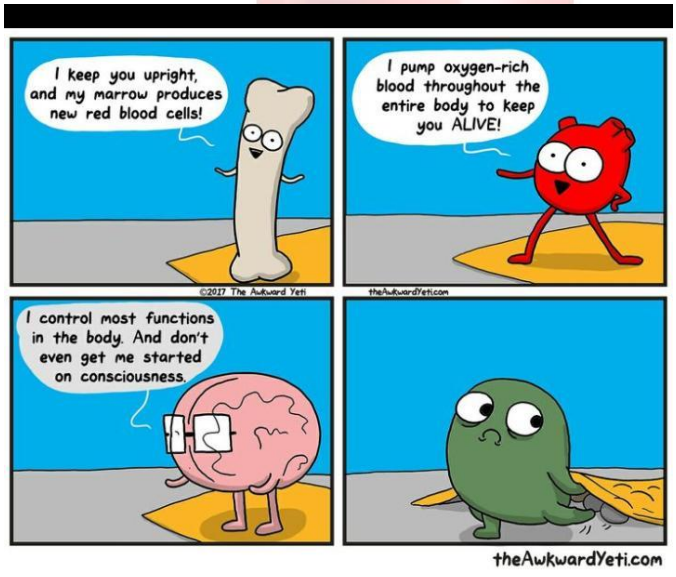

EXCUSE ME, WHERE'S THE NANOTECHNOLOGY DEPARTMENT?
YOU JUST TROD ON IT

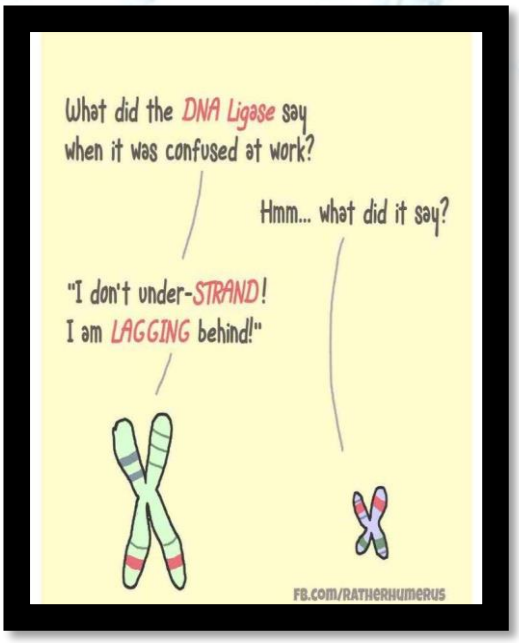

MICROSCOPIC VIEW OF PATHOGENS




**Vartika Majumdar**
**BMS 2nd Year**




**Akriti**
**BMS 3rd Year**

# BIOMEDICAL STUDENTS

**BATCH 2018 – 2021**

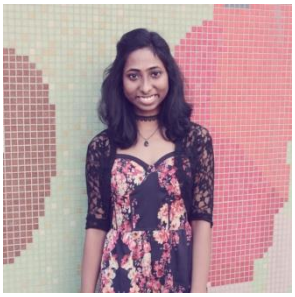
**BATCH 2017 – 2020**

**BATCH 2016 – 2019**

# THE OUTGOING BATCH

**AKRITI**

**APOORVA**



**APARNA**

**KANIKA**

**KHUSHBOO**

**BHUMIKA**

**SHREYA**

**PRABHA**

**A batch full of talents, a batch of twenty five.**
**A batch that can have fun, and yet work like a machine.**
**Well that's out going batch of 2016-2019**

*There is Akriti Sharma, whose list of talents is not small,*
*With a pure heart and perfect smile.*
*From photography to designing, she can do it all.*

*Next comes, Aparna with melodious voice, For her literature talent, let's make some noise.*
*Apurva is famous for her wide range of facial expression,*
*Lipika is the sweetest, with a mind full of imaginations.*

*Lusinmi loves to sleep and have a good time,*
*She is the fashion queen, oops I cannot think of any rhyme.*
*Kanika is the silent killer of our class,*
*With her kitty smile, she did a lot of blast.*
*Parvathi, the south Indian beauty of our batch,*
*She has vast knowledge, that don't have any match.*
*Satarupa has a beautiful voice, yet she refuses to sing,*
*Miss topper of class, wears lots of rings.*

*Poonam Yadav is friendly, lively and loves to make people laugh,*
*Undoubtedly she is the soul of our class.*
*Priyanka (aka pinki) wardrobe colour matches her name,*

*She is always eager to go home.*

*With her beautiful smile and full of confidence, Lisha starts her day,*
*'I can talk' is her favourite thing to say.*

**LIPIKA**

**LUSINMI**

**MANISHA**

**MANISHA YADAV**


POONAM

PRACHI BHARGAVA

PRACHI BHHATNAGAR

.5

SANDHYA

*Traffic jam every morning makes Shraddha come in late,*
*Her dancing and aerobic skill makes her look great.*

*Neha Rawat doesn't like people when they shout,*
*With the perfect sense of humour, she is the one who loves to hangout.*

*Neha Gupta is soft spoken girl whose smile can make your day,*

*She spends her time working on this magazine for our fest day.*

*Prachi Bhargava –the chess champion and yoga girl with strong fire,*
*Prachi Bhatnagar knows how to dance, walk and spread love in air.*

*Shreya finds pride in being independent,*
*She never needs to be defendant.*

*Kathak queen and shuffleshot soul is our Prerana,Hey miss teddy bear 'hum sab ke dil mein rehna'.*

*Emotional soul Khushboo is like her name, With the practical and determined mind, Sandhya Bhardwaj is winner of the game.*

*Next come Sanya Malik with huge bags collection,*

*'Kal class hogi ya nhi, btado wrna' I have my travelling option.*

*Manisha yadav is a girl with a heart of Gold, Yet deciding what's her goal. Manisha is full of life, always ready to give HI five.*

*Prabha and Bhumika have long, silky and beautiful hair, During the class, they always sit calmly on their chair*

**NEHA RAWAT**

**PARVATHI**

**PRIYANKA**

**LISHA**

**SHRADHA**

**SATARUPA**

**SANYA**

**PRERNA**

**NEHA GUPTA**

***Each one of our classmate will be missed long after we are gone,***

***The editor gave me less space or I could have written on and on and on.***

**POONAM YADAV**
**BMS 3rd Year**

# STUDENT ACTIVITIES


THSTI SCIENCE SETU
Debate Competition

# BRAIN TEASERS

# QUIZ

Question 1: Optical tweezers...

- Are used to remove facial hair with miniaturized laser beams
- Use light to manipulate particles as small as a single atom
- Are a nanotechnology-based tool for stamp collectors
- Don't exist

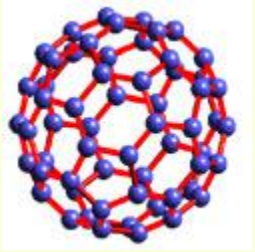
Question 2: Nanorobots (nanobots)...

- Do not exist yet
- Exist in experimental form in laboratories
- Are already used in nanomedicine to remove plaque from the walls of arteries
- Will be used by NASA in the next unmanned mission to Mars

Question 3: Which of these well-known phrases from Star Trek depends on the (fictional) use of nanotechnology?

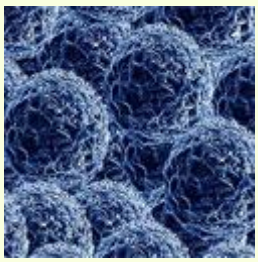
- Beam me up, Scotty!
- Tea. Earl Grey. Hot.
- You will be assimilated. Resistance is futile.
- All of the above

Question 4: What is a buckyball?



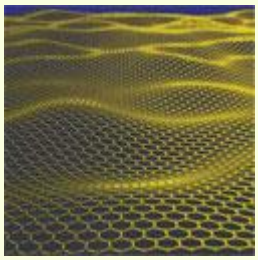
- A carbon molecule (C60)
- Nickname for Mercedes-Benz's futuristic concept car (C111)
- Plastic explosives nanoparticle (C4)
- Concrete nanoparticle with a compressive strength of 20 nanonewtons (C20)

Question 5: Which one of these statements is NOT true?



- Gold at the nanoscale is red
- Copper at the nanoscale is transparent
- Silicon at the nanoscale is an insulator
- Aluminum at the nanoscale is highly combustible

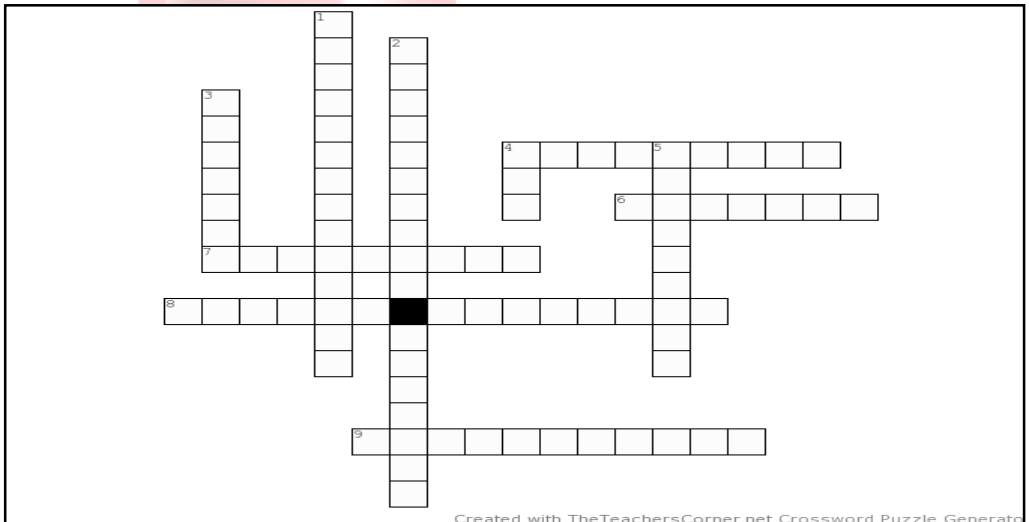
Question 6: What is graphene?



- A new material made from carbon nanotubes
- A one-atom thick sheet of carbon
- Thin film made from fullerenes
- A software tool to measure and graphically represent nanoparticles

**Neha Rawat**
**BMS 3rd Year**

# CROSSWORD



Created with TheTeachersCorner.net Crossword Puzzle Generato

**Across**

4. Identification of illness based on symptoms
6. Biological catalysts
7. A device that uses x-rays instead of visible light to form images of very small structures
8. Allotropes of carbon with a cylindrical nanostructure
9. Molecular repair and cell surgery

**Down**

1. Science that deals with matter at atomic scales
2. A neurological disorder associated with memory
3. The most common chemical element used in nanomedicines
4. The molecular basis of heriditary
5. A microscopic computer controlled robotic device

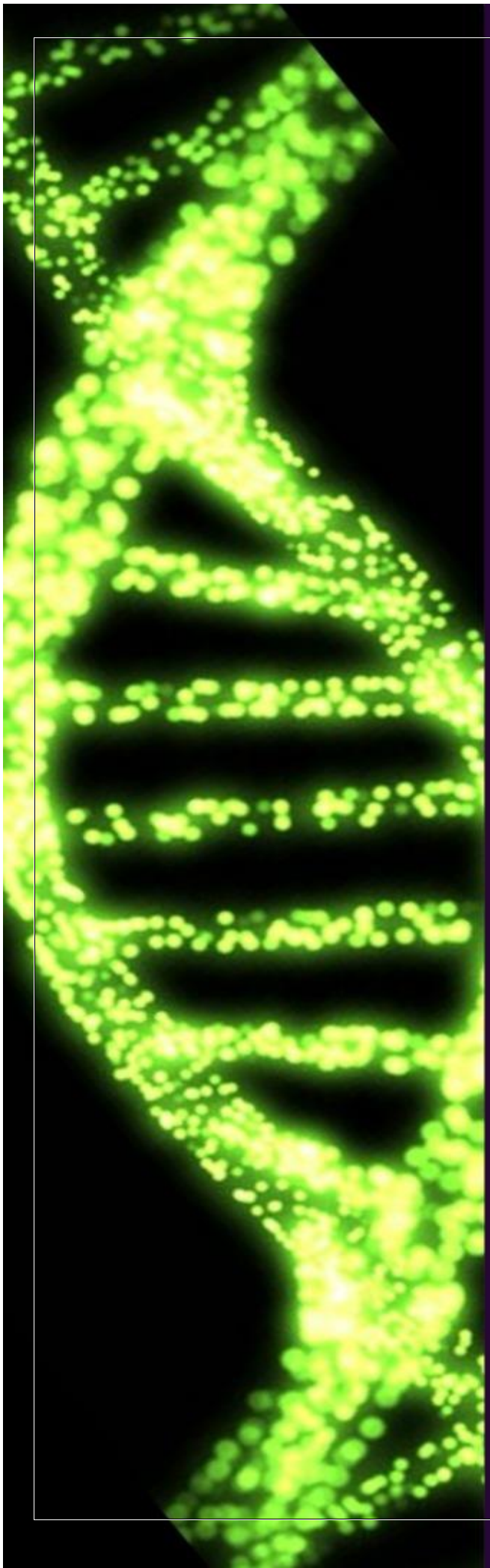
# ANSWERS

**CROSSWORD :**

| Across | Down |
|---|---|
| 4. Identification of illness based on symptoms (**diagnosis**) | 1. Science that deals with matter at atomic scales (**nanotechnology**) |
| 6. Biological catalysts (**enzymes**) | 2. A neurological disorder associated with memory (**alzheimers disease**) |
| 7. A device that uses x-rays instead of visible light to form images of very small structures (**nanoprobe**) | 3. The most common chemical element used in nanomedicines (**silicon**) |
| 8. Allotropes of carbon with a cylindrical nanostructure (**carbon nanotube**) | 4. The molecular basis of heriditary (**dna**) |
| 9. Molecular repair and cell surgery (**nanosurgery**) | 5. A microscopic computer controlled robotic device (**nanorobot**) |

## QUIZ :

**Q1**. (b) Use light to manipulate particles as small as a single atom
**Q2.** (a) Do not exist yet
**Q3**. (d) All of the above
**Q4**. (a) A carbon molecule (C60)
**Q5**. (c) Silicon at the nanoscale is an insulator
**Q6.** (b) A one-atom thick sheet of carbon



# THE BLEND OF SCIENTIFIC MINDS

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