



BIOTECHNOLOGY STUDENTS ASSOCIATION

# BIOSTUMAG

The Real Marvel of Science !!!

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## MESSAGE

### PRINCIPAL'S MESSAGE



I am immensely delighted to learn that the Dept of Biotechnology is bringing out a quarterly Departmental Scientific Magazine named "BIOSTUMAG".

It is, indeed a praiseworthy effort. This magazine I am sure will provide a platform for all students and teachers of Biotechnology and other related departments for publishing their research articles, reviews, research ideas etc..

I would like to congratulate and gratefully acknowledge the efforts of all the people who have been behind it. I also wish that this will be the beginning of a continued activity which will eventually lead to the publication of a regular, peer reviewed, Biotechnology Journal of SIAS.

Prof. (Dr.) A. A. M. Kunhi,  
Principal & Director (Research)

"Education makes people easy to lead. But difficult to drive, easy to govern but impossible to enslave." Active learning is quite different than the traditional lectures for which Colleges are known – the process encourages students to think at a progressively higher level, and takes their learning beyond memorization. In doing so, we enhance their critical and creative thinking as well as their problem-solving and communication skills. SIAS 's continues to attract top students who are motivated only through their academic merit, but also through their energy, initiative and scientific spirit and enthusiasm. We're well positioned to empower the SIAS students for continued success in an ever-changing world. I hope you are as proud of your SIAS education. It is a matter of pleasure that Department of Biotechnology is going to publish an inaugural issue of BIOSTUMAG, a quarterly magazine. This BIOSTUMAG has been a joy to read, as it is filled with interesting research articles, facts and informative reviews.

Mr. Mansur Ali. N, Officer On Special Duty

### Message from Chief Editor

Inspiring a Dream to a Reality.... Greetings and warm welcome to our first issue of BIOSTUMAG. What you will find in the pages of BIOSTUMAG Magazine is a collection of inspired, inquisitive and instructive articles written by Faculties and Students from Department of Biotechnology; It also includes Student Achievements and Departmental activities. The Department of Biotechnology evolved with new thoughts and ideas which is vital for Biotechnology education. I express my deep sense of gratitude to Principal, Colleagues and Students who involved in contribution of the relevant scientific articles for the inaugural issue. Department will continue its efforts for next issue to bring the new articles and make it a grand success. You will notice the five categories of articles; Research articles, Science spotlights, True facts, Information on a Scientist, Nobel Prize Laureates and so on. It gives me a great pleasure to welcome you to the inaugural issue of BIOSTUMAG. It is my expectation this magazine will give a platform for developing our students scientific motivation and in future lead to publish a Biotechnology Journal.

Dr. Manjusha. S., Chief Editor & Assistant Professor

## The Potential Scope of Biotechnology

"Biotechnology" refers to the use of living organisms or their products to modify human health and the human environment. Biotechnology in one form or another has flourished since prehistoric times. When the first human beings realized that they could plant their own crops and breed their own animals, they learned to use biotechnology. Discoveries that fruit juices fermented into wine, that milk could be converted into cheese or yogurt, or that beer could be made by fermenting solutions of malt and hops began the study of biotechnology. When the first bakers found that they could make a soft, spongy bread rather than a firm, thin cracker, they were acting as fledgling biotechnologists. The first animal breeders, realizing that different physical traits could be either magnified or lost by mating appropriate pairs of animals, engaged in the manipulations of biotechnology. The term brings to mind many different things. Some think of developing new types of animals. Others dream of almost unlimited sources of human therapeutic drugs. Still others envision the possibility of growing crops that are more nutritious and naturally pestresistant to feed a rapidly growing world population. The applications are vast and simply mind-boggling. On one hand, it caters to the industrial sector such as food and beverages industry, textiles industry, biological products, medicines and pharmaceuticals while on the other hand this branch of science caters to the requirements of agriculture, animal husbandry, nutrition and environmental conservation. The list is a long and an envious one. Biotechnology has made an impressive impact in the area of drug production, gene therapy, pharmagenomics and genetic testing. Another interesting area which is coming up in big way is improvement of crop plants using biotechnology where biofortification method is being used to improve the nutritional value of the crops. Biotechnology is one of the fastest growing field in the area of research and development. It is also called a technology of the future or technology of tomorrow because of it's unprecedented impacts on the human mankind and the universe as a whole. Due to it's interrelation with other fields such as industry, agriculture, computers etc, it is going to create amazing opportunities for manipulating the biological systems and thereby understanding the mysteries of fundamental life processes.

Dr Servin Wesley. P, Head, Dept of Biotechnology

## Hydroponics- An Alternate Farming

The increased population, sub-urbanization of the forest (excluding land for commercial food production), improper agricultural practice using synthetic fertilizers which altered soil pH, pesticides which drastically reduced soil flora, fauna and fertility which made a search for new alternative technique for obtaining the food and medicinal plants of better quality, yield and for growing fresh produce in non-arable areas of the world. Hydroponics was found to be a better alternative and can be defined as cultivation of plants without soil, which is being commercially used in most of the western countries.

Hydroponics is an excellent method of conducting research with controlled conditions of nutrient availability. Water and land conservation are more important now than ever before. Seventy-five percent of all fresh water is used for agriculture, yet these fresh water supplies are being over allocated, depleted and contaminated at an alarming rate. At the same time, more than 1

million acres of prime farmland are destroyed every year by suburban sprawl.

Hydroponics is a technical reality. Such production systems are in use for horticultural crops throughout the year, which otherwise are seasonal and hence, not available for much of the year. The development and use of controlled environment agriculture and hydroponics have enhanced the economic well being of many communities throughout the world. The use of controlled environments can overcome cultivation difficulties and could be a means to manipulate phenotypic variation in bioactive compounds. When it comes to being environment friendly, hydroponics is beneficial over geponics, mainly because these methods do not promote the use of chemical fertilizers or pesticides.

Hydroponics will also be important to the future space programs. NASA has extensive hydroponics research plans in place, which will benefit current space exploration, as well as future, long-term colonization of Mars or the Moon. As we haven't yet found soil that can support life in space, and the logistics of transporting soil via the space shuttles seems

impractical, hydroponics could be the key to the future of space exploration. The benefits of hydroponics in space are two-fold: It offers the potential for a larger variety of food, and it provides a biological aspect, called a bio-regenerative life support system.

Like other fields, agriculture also tends to move toward higher-technology, more capital-intensive solutions to problems. Hydroponics is highly productive and suitable for automation. However, the future growth of controlled environment agriculture and hydroponics depends greatly on the development of systems of production that are cost-competitive with those of open field agriculture.

Dr. B. Sahaya Shibu  
Assistant Professor

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## DNA Barcoding: A new Molecular Tool for Food Traceability

*Dr. Manjusha. S.*

DNA barcoding is a taxonomic method that uses a short genetic marker from a standard part of the genome of an organism's DNA to identify it as belonging to a particular individual, breed/cultivar, or species. It represents an essential tool for quality controls of food products, to guarantee food traceability, to safeguard public health, to minimize food piracy, and to valorise local and typical agro-food production systems. DNA barcoding is a molecular technology that allows the identification of any biological species by amplifying, sequencing and querying the information from genic and/or intergenic standardized target regions belonging to the extranuclear genomes. Although these sequences represent a small fraction of the total DNA of a cell, both chloroplast and mitochondrial barcodes chosen for identifying plant and animal species, respectively, have shown sufficient nucleotide diversity to assess the taxonomic identity of the vast majority of organisms used in agriculture. This article explains the effective method to exploit the effectiveness of DNA barcoding as a tool for food traceability which is useful in quality control and detection of commercial fraud.

### What is DNA barcoding?

Mitochondrial DNA (mtDNA) was chosen as source of markers for barcoding animal species. Of the protein-coding genes present on the animal mitochondrial genome, the use of cytochrome c oxidase subunit I (COI) was proposed as a standard barcode marker for animal species.

DNA barcoding is a molecular based system, which allows scientists to identify particular species, by comparing short genetic markers in the specimen DNA with reference sequences. Its success depends on: i) the molecular variability between species and ii) the availability of high quality repositories of reference sequences (i.e. DNA sequences of known species). An example of the latter is the Barcode of Life Database (BOLD). This is coordinated by the International Barcode of Life Project and is a repository which supports the collection of reference sequences, with the aim of creating a reference library for all living species. It includes a species identification tool which returns a taxonomic assignment to the species level whenever possible. It is a useful resource for research and practical applications. Moreover, DNA barcoding can be applied to distinct food products and matrices deriving from single or mixed species, producing species-specific DNA sequences (i.e., barcodes). In this way this methodology could be used to discover voluntary or accidental replacements associated with foods mislabelling and commercial frauds.

### DNA barcoding of seafood, meat, edible plants, dairy products and processed foods

The applicability of DNA barcoding for the identification and traceability of seafood, meat, edible plants, dairy products and processed foods is much valuable. The technique has been used to identify commercial fraud, e.g. the illegal and dangerous substitution of the toxic puffer-fish mislabelled as monkfish. Despite its proven effectiveness, few studies on the application of DNA barcoding to certain categories of seafood (e.g. crabs and lobsters) have been conducted. The applicability of DNA barcoding for the identification and traceability of mammalian (e.g. beef, pork, lamb, venison, horse) and avian (e.g. chicken, turkey) meat was also highlighted. The legal responsibility for placing safe food on the market lies with the food industry and food business operators must remain vigilant in ensuring the authenticity of ingredients.

### What is the future of DNA testing of foods?

It can be concluded that DNA barcoding can be used as a universal tool for food traceability. It can be used in different contexts by different operators (e.g. by regulatory authorities, researchers). While some groups of organisms, such as fish, have a well-populated reference database and more work is required to provide high quality repositories of reference sequences for other groups of organisms. Improved methods will assist in the protection of consumers and producers from frauds, and animal species from illegal commerce.



**Harsheema. O, BSc, (2013-16) batch has received "Best Outgoing Student Award of Biotechnology Department" in 2015**

## Onsite learning!!!

The Students of 3rd semester B.Sc Biotechnology accompanied by two teaching faculties Dr. P. Servin Wesley and Dr. Manjusha S. visited Kerala State Bio-control Laboratory and Bio-fertilizer production & Composting unit at Department of Agricultural Microbiology, Kerala State Agricultural University, Mannuthy, Thrissur on 29 August 2016 as a part of student's curricular activity. The students were interested seeing the Bio-pesticide production. During the plenary session they interacted with Dr. Suresh of Biocontrol Laboratory. The trip was highly informative and motivational.



## GENETIC ENGINEERING

*Kavya K (1<sup>st</sup> Semester B.Sc)*

The use of recombinant DNA technology has become common place as new products from genetically altered plants, animals and microbes have become available for human use. In 1997, Dolly made headlines as the first successfully cloned large mammal (sheep). Since then there have been many similar advance in medicine, such as treatment for cancer, many advances in agriculture; such as transgenic insects, resistant crops and many advance in animal husbandry; such as growth hormones and transgenic animals.

MEDICINES: Genetic engineering has resulted in a series of medical products. The first two commercially prepared products from recombinant DNA technology were insulin and human growth hormones, both of which were altered in *E. coli* bacteria. The following abbreviated list were the respective products; Tumor necrosis factor: Treatment for certain tumor cell.

Interleukin: Cancer treatment, Immune deficiency and HIV treatment.

Taxol: Treatment for ovarian cancer. Interferon: Treatment for cancer and viral infection.

In addition, a number of vaccines are now commercially prepared from recombinant host. At one time vaccines were made by denaturing the disease and then infecting it into humans with the hope it would activate their immune system to fight future intrusions by that invader. Unfortunately, the patients sometimes still ended up with disease.

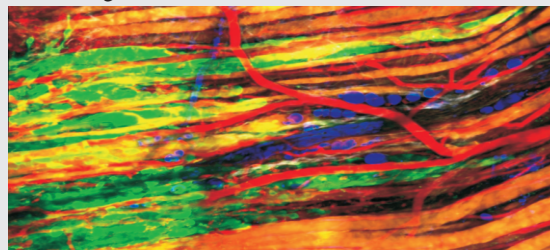
With DNA technology, only the identifiable outside shell of the microorganism is needed, copied and injected into a harmless host to create a vaccine. This method is likely to be much safer because the actual disease-causing microbe is not transferred to the host. The immune system is activated by specific protein on the surface of microorganism. DNA technology takes that into account and only utilizes identifying surface features for vaccines. Currently vaccine for hepatitis B virus, herpes takes two viruses and malaria is in development for trial use in the new future.



## Photos you must not missed it!!!

*Sahira K.V., 1<sup>st</sup> Semester M.Sc*

Cancer caught in the act (Source: nature news)



Cancer cells in living mice shows how streams of melanoma cells (green) invade skin tissue. The cells are guided by structures such as muscle fibres (orange), nerve fibres (blue), collagen (grey) and blood vessels (red). Methods like "Intravital Microscopy" for monitoring tumour cells in living animals are transforming Scientist's our view of cancer.

Fat fuels cancer's spread in mice (Source: nature news)



Researchers have identified a population of oral tumour cells that are able to make the journey in mice, and has found that such cells may feast on fats to fuel the trip. These Fat cells could be a key to how cancers spread throughout the body.

## Our nature ....

*Thabsheer C, III<sup>rd</sup> Semester BSc*



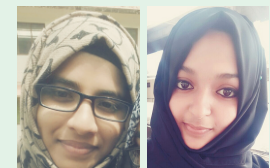
## Student Achievements



Shahnaz TK  
II BSc won 3<sup>rd</sup> prize in Malayalam Quiz organised by Malayalam Department in November 2016.



Sumayya TK  
II BSc won 3<sup>rd</sup> prize in Malayalam Review organised by Malayalam Dept. in November 2016.



Sahda Subair and Aysha Minsy MV  
II BSc won 2<sup>nd</sup> prize in Vaikkom Muhammed Basheer Quiz organised by Malayalam Department in November 2016.



Mohammad Fazil P  
II BSc won 1<sup>st</sup> prize in "MR. SAFI" contest of SMACZNEGO FEST organised by Department of Food technology in November 2016.



Shafna Naseer  
II BSc won 2<sup>nd</sup> prize in Memory test of SMACZNEGO Fest organised by Department of Food technology in November 2016.



## Immobilised- Biocatalysts for Waste Water Treatment

Amrutha , II<sup>nd</sup> Semester BSc

Sewage treatment holds certain beneficial aspects among which the major objectives include reduction of communicable diseases, prevention of surface water pollution and the need to reduce odors and flavors associated with purification. By 1860 the most prominent form of sewage treatment in urban areas was sedimentation followed by irrigation over agricultural land.

An immobilized biocatalyst can be defined as a biocatalyst for which movement in space is completely restricted. It forms a distinct phase within the bulk phase in which substrate, effectors and inhibitor molecules are dispersed and their exchange is facilitated. Enzymes are suitable as a catalyst because it requires low energy inputs they are heat labile and easy to terminate reactions. Enzymes require much less complex media, less wastes are generated and continuous operation is easier. Immobilization of biocatalysts (enzyme or cells) can add advantages to biological treatment system. Why are cells suitable as biocatalyst?

We know enzymes within the cells are better protected from denaturation. Degradation may be composed of a series of reaction working in concert and hence it is difficult to develop different systems for different enzymes working together. Isolating and purifying these enzymes and using them is expensive, also chances of denaturation is more. Some enzymes occurs as induced enzymes. Exploitation of such enzymes would be easier if the cells used has less degradation rates. Their resistance to toxic pollutants will be possibly high if cells are used as monoculture or mixed culture rather than using isolate enzymes.

Applications of immobilized biocatalyst in waste water treatment fall into four categories:

- BOD/COD Reduction
- Pollutant detoxification
- As biosensors
- For bioconversion of waste to get specific products

## All things are difficult before they are easy.... "Feynman Technique"!!!

Ms. Nafila P.P, Assistant Professor

Every living organism acquires the survival instinct by the virtue of its birth but human beings acquire only during the advancement of age. All humans, regardless of gender, age, or environment, learn through the senses. Our capacity to learn is largely determined by the level of our conscious attention to our senses. The process of learning in humans take place obviously till death. One has to practice a process to become an expert in it. The more we are aware of what we see, smell, taste, hear, touch, mood of a situation, the more likely we will process information on a thoughtful level. We usually thought learning was all about the hours you put in, but famous Nobel Prize-winning physicist "Richard Feynman" has discovered something that changed his life. He understood the difference between "knowing something" and "knowing the name of something. Stumbled upon a formula for learning that ensured he understood something better than everyone else.

It's called the "Feynman Technique" and it will help you learn anything deeper, and faster. The topic, subject, or concept you want to learn doesn't matter. Pick anything. The Feynman Technique works for everything. It is incredibly simple to implement. It is not only a wonderful method of learning, but it is also a window into a different way of thinking.

There are three steps to the Feynman Technique

- Teach it to a child : If we really don't understand something, most of us prone to use the words that are difficult for others to understand, through this we are making fool ourselves and preventing others from understanding it, whereas we can overcome this by making the content into very simple paragraphs as if you are going to teach a very small child that is simplifying the tough words to most common words, so that you force yourself to understand the concept at a deeper level and finally we can understand the whole content without even a single gap!!
- Review : Always make a review of what we learned or the matter you pinpointed as you don't know through this we can understand that whether we have understood the topic in a very deep manner. Whenever you get stuck, go back to the reference material or lectures and read or relearn the material until you do get it enough that you can explain it on the paper.
- Simplify the concept and transmit: If your concept is still too hard to grasp, try to simplifying it once more and make the content in the manner of a story so that it will be easy to remember too. Now you are fit enough to pass the content to someone else, which means when you are trying to introduce a topic who doesn't know anything about it, it gives you a chance to be aware of each and every minute details on it.

Flocculation of cells that occurs in activated sludge process are trapped on a slime layer in trickling filter beds. This may be considered as a preliminary method of applying immobilized biocatalyst. Improvements in immobilization techniques and its procedures have been proved useful in waste water treatment. Some of the examples of many application of s immobilized biocatalyst for waste water treatment has been briefly mentioned.

*Hypomicrobium Spp* is grown on sand bed with added methanol to cause nitrate reduction at East Hyde Sewage works.

*Micrococcus denitrificans* cells can be encapsulated in liquid membranes for the reduction of nitrate to nitrite. Capsules containing 500-600 cells are formed by emulsification using cells, surfactants or oil membrane strengthening additives.

These capsules retains about 78% of activity for 120 hours as compared to free cells (zero in 16 hours). The immobilized cells also tolerate  $10^{-4}$  m HgCl<sub>2</sub>, white free sensitive cells.

Cyanide present in aquatic water can be effectively detoxicated using immobilized mycelia of *Stemphyllum loli* in which cyanide hydrolase have been induced.

Flocculation by polyelectrolytes is an effective method of immobilization.

Immobilized enzymes can be used to hydrolyse lactose having high BOD value which is generated in large amounts from cheese making industry. Use of immobilized amylase enzyme has been proposed for the treatment of waste water from wheat starch industry and also to clarify colloidal starch.

Advantages of immobilization of a Biocatalyst

Reuse or continuous use of cells enhances overall efficiency. Biocatalyst doesn't contaminate the so formed products. Cells are evenly dispersed by immobilization.

Smaller reactors can be used if the biocatalyst concentration is more. Immobilized cell are used with more ease to exploit the kinetic features of continuously stirred and packed bed reactors.



## Strange Fever in India

Athira P, III Semester B.Sc

What is running in India now days?

If I say strange fevers are running in and around India; you cannot simply neglect it.

Monsoon is the time when I experience the outbreak of viral fevers. For the past years dengue and chikungunya were penetrating in our country. Now the situation has changed. 30% of the fevers are becoming undiagnosed.

Apart from dengue and chikungunya two other fevers that could be seen are:

- 1) fever due to normal respiratory infection.
- 2) Fever, which shows symptoms of chikungunya but not get confirmed in the test. The second case in the above had really put the medical field in a fight spot. Doctors find difficulties in diagnosing the strange fever with which patient approach them. Treatment cost is getting increased, as patients have to undergo general tests. But all these tests still remain unconcluded. What may be the reason for this 'mystery fever'? Science field came up with a simple reason telling that viruses are changing their genetic pattern. I can see fevers with simple symptoms to that of chikungunya but reveals negative result during the tests. There is evidence that mutation have become common. Ebola virus in 2014 outbreak was different from the earlier outbreak. It has accumulated more than 395 mutations between 2014-16.

Chikungunya, which was largely confirmed to developing countries in Africa and Asia before 2004, also reached in developed nations like France due to a single A.A change in the envelope glycoprotein. These evidences give us a serious warning of future variant diseases. Medical field should be very alert in the upcoming days. So that they can be wise enough to understand and fight any strange intrusion.

## Start Fighting Against Pollution From Your Indoor Spaces

Athira P, III<sup>rd</sup> Semester B.Sc

Almost all of us are aware about the increasing rate of pollution now a days. But most of us are worried and conscious about the outdoor pollution which is much talked about and are unaware of the concentration of pollutants present in the indoor air. A large part of our time is spend in places, in our words called the "safe" place, that is our houses or offices (20-21 hours a day). These places are the major sources of indoor pollution where numerous disease causing contaminants are produced.

The houses and buildings built these days lack open spaces and proper ventilation systems. ACs have become a must for these sealed areas which recycles the air present in the area and traps the contaminants not allowing them to escape, thus increasing the concentration of contaminants.

This in turn supports the growth of molds and fungi.

Apart from living organisms, the paint fumes, perfumes, candles, mosquito repellants and cleaning solutions emit harmful VOC's [volatile organic compounds] adding toxic gases to the air, which are more toxic than pollutants from industries.

Why are children falling sick more often than adults?

After the birth of a child, they are being exposed to the indoor spaces for a longer time. Like any other organs in a child's body, the respiratory tract is also very sensitive. The high concentration of pollutants present in the surroundings may block the respiratory tract and may lead to the air tract inflammations, lowered immunity levels and constrictions, which will finally lead to serious respiratory tract infections. Children and even adults who are continuously exposed to such conditions may develop viral infections and serious respiratory problems later in their life.

Nowadays we depend too much on doctors to cure our ailments. Most of the times we forget the fact that the so called cure is actually the drug controlling or suppressing the symptoms. Instead if we concentrate more on the effects of air pollution and work to decrease it to an extend, we can successfully prevent most of the allergic infections. And the change must begin from our homes and offices.

"Fresh air is the best cure"

Today's lifestyle has been changed to an extend that we have forgotten our ancient wisdom. In olden days doctors diagnosed diseases by just carefully observing the patients. Have we forgotten those days? In those days when diseases were out of bounds they used to send patients to a place where they feel fresh by the fresh air, they mainly preferred hills, forests for this treatment.

Our historical monuments which are the best examples for the cross ventilation and by using this we realize the importance of fresh air due to our modern lifestyle, we are opening our windows not only for the sunlight and air to enter but also the harmful pollutants which may cause severe damage to our lungs. By living in a polluted environment our aim should be to reduce the indoor air pollution by controlling the pollutants inside the house itself. By breathing fresh air at least 8 to 10 hours a day will nourish our cardiovascular system, nervous system etc. This will make us more energetic and fight diseases.

Air purifiers are not 100% effective method because in the market different branded purifiers are available by totally depending upon. It may lead to further problems. The most effective way of controlling the pollutants emitted in the indoor is by our self by trying to reduce the pollutants produced in the indoor spaces. "We ourselves are responsible for our illness."





## Zika Reduces Male Fertility

Hamdiya, III<sup>rd</sup> Semester B.Sc

Zika infection adversely affect the male fertility. Recent studies are focussed on how Zika virus affect pregnant women and cause severe birth defects. A new study from investigators at Washington Univer-sity School Of Medi-cine (WUSM) performed in mice, showed that Zika affect the male reproductive system interfering with the ability to produce offspring. Zika affected males might face low testosterone levels and low sperm count thus directly affecting their fertility.

These findings from the study were published recently in an article entitled "Zika virus infection damages the testes in mice". Recent researches were focused on how Zika virus can persist in the semen in men for months. Centres for disease control and prevention recommended that men who travelled Zika affected regions should use condoms for six months, regardless of whether they have had symptoms of Zika virus or not. The WUSM researchers began their work by injecting the virus in mice. After one week, the virus was seen to migrate to testes, which bore microscopic signs of inflammation. After two weeks, the testicles were significantly smaller with their internal structures collapsing and many cells were already dead or dying. After 3 weeks, the mice testicles had shrunk to one tenth their normal size and internal structures were completely destroyed. The mice were monitored until 6 weeks and even after removing the virus from their bloodstreams, the testicles did not heal.

Co-senior study investigator Micheal Diamond ,MD PHD Professor of Medicine, Pathology, Immunology, and Molecular Microbiology at WUSM noted that the damage is irreversible. The Sertoli cells that helps to determine the structure of testes, the barrier between bloodstreams and testes and nourish the developing sperm cells are completely destroyed. By 6 weeks after infection the number of motile sperms was decreased 10 folds and testosterone levels were lowered. Co-Senior study investigator Kelle Moley Md, Professor of Obstetrics and Gynaecology and Director ,University Centre for Reproductive Health Science remarked this is the only virus that cause severe symptoms of infertility. The virus can also cross the barrier that separates the testes from bloodstream to infect testes directly. No reports have been yet published that showed the link between infertility in men to Zika infection. Men with low testosterone may experience a low sex drive, erectile dysfunction, fatigue and loss of body hair and muscle mass. Low testosterone levels can be diagnosed by simple blood tests. However there is no vaccine or treatment for Zika.

### INTERESTING FACTS

Firoz Mohammad Khan, I<sup>st</sup> Semester BSc

- Swans have only one partner for their entire life ,if their partner dies they could in fact die of heartbreak.
- The obsession to stay in bed and finding irresistible to get out of it is called Clinomania.
- Left handed people have multitasking ability.
- Only world's 2% population has people with green eyes.
- An average time a girl can keep a secret is only 2 days.
- Intelligent people thinks fast which makes their handwriting sloppy.
- A one minute kiss can burn 26 calories.
- We are most creative in the night and least creative in afternoon.
- One of the main causes of depression can be overthinking.
- Faces seem more attractive when you are paying more attention to them.
- Pluto's surface has a heart shaped sea on its surface that is filled with poisonous ice.
- People enjoying spicy foods are likely to develop alcoholic habits.

## Bioterrorism

Innu MA. I<sup>st</sup> Semester B.Sc

Bioterrorism attack is the deliberate release of viruses, bacteria or other germs(agents) used to cause illness or death in people, animals or plants. These agents are typically found in nature, but it is possible that they could be changed to increase their ability to cause disease, make them resistant to current medicines, or to increase their ability to spread into the environment. Biological agents can be spread through air, through water, or in food. Terrorists may use biological agents because they can be extremely difficult to detect and do not cause illness for several hours to several days. Some bioterrorism agents like the smallpox virus, can be spread from person to person and some like anthrax can not.

## Nobel Prize for Physiology/Medicine in 2015 YOSHINORI OHSUMI (1945 In Fu kuaka)

Hamna Fathima.K, I<sup>st</sup> Semester M.Sc



Yoshinori Ohsumi, a Japanese cell biologist, was awarded Nobel Prize in physiology of medicine on Monday [3<sup>rd</sup> October, 2016] He was awarded for his discoveries regarding cell and how it recycles its components. This process is "autophagy" derived from Greek word for auto meaning "self" and phagein meaning "to eat".

It is a crucial process. The non-essential components in a cell are degraded within the cell membrane and are further used for their metabolism. Cells also use autophagy to destroy invading viruses and bacteria and utilize them for recycling. They are also helpful in remediating damaged structures in the cell.

The concept of autophagy emerged during the 1960's Researchers first observed that there were difficulties in studying the phenomenon as little was known about the concept until, in a series of experiments in early 1990's. Yoshinori Ohsumi used Baker's yeast to identify genes essential for autophagy. He further elucidated that similar mechanism took place in our cells. Mutations in autophagy genes can cause diseases including cancer and several other neurological disease.

## Will Artificial Intelligence Bring Real Terminators In Future?

Henna Fathima, I<sup>st</sup> Semester BSc



Science fiction has, for many years, looked to a future in which robots are intelligent and cyborgs — human/machine amalgams — are commonplace: The Terminator, The Matrix, Blade Runner and I, Robot are all good examples of this. However, until the last decade any consideration of what this might actually mean in the future real world was not necessary because it was all science fiction and not scientific reality. Now, however, science has not only done a catching-up exercise but, in bringing about some of the ideas thrown up by science fiction, it has introduced practicalities that the original story lines did not appear to extend to (and in some cases have still not extended to).

What we consider here are several different experiments in linking biology and technology together in a cybernetic fashion, essentially ultimately combining humans and machines in a relatively permanent merger. Key to this is that it is the overall final system that is important. Where a brain is involved, which surely it is, it must not be seen as a stand-alone entity but rather as part of an overall system, adapting to the system's needs: the overall combined cybernetic creature is the system of importance.

Each experiment is described in its own section. Whilst there is a distinct overlap between the sections, they each throw up individual considerations. Following a description of each investigation, some pertinent issues on the topic are therefore discussed. Points have been raised with a view to near term future technical advances and what these might mean in a practical scenario

Experimental cases have been reported in order to indicate how humans, and/or animals for that matter, can merge with technology in this way, which throws up a plethora of social and ethical considerations as well as technical issues. In each case reports on actual practical experimentation have been given, rather than merely some theoretical concept.

In particular when considering robots with biological brains, this could ultimately mean perhaps human brains operating in a robot body. Therefore, should such robots be given rights of some kind? If one was switched off, would this be deemed cruelty to robots?

More importantly at this time, should such research forge ahead regardless? Before too long we may well have robots with brains made up of human neurons that have the same sort of capabilities as those of the human brain.

In the section on a general-purpose invasive brain implant as well as implant employment for therapy, a look was taken at the potential for human enhancement. Extrasensory input has already been scientifically achieved, extending the nervous system over the Internet and a basic form of thought communication. So it is likely that many humans will upgrade and become part machine themselves. This may mean that ordinary (non-implanted) humans are left behind as a result. If you could be enhanced, would you have any problem with it?

Then came a section on the more standard EEG electrodes which are positioned externally and which therefore are encountered much more frequently. Unfortunately, the resolution of such electrodes is relatively poor and they are indeed only useful for monitoring and not for stimulation. Hence the issues surrounding them are somewhat limited. We may well be able to use them to learn a little more about how the brain operates, but it is difficult to see them ever being used for highly sensitive control operations when several million electrodes feed into the information transmitted by each electrode.

As well as taking a look at the procedures involved, the aim of this article has been to have a look at some of the likely ethical and social issues as well. Some technological issues have though also been pondered on in order to open a window on the direction that developments are heading in. In each case, however, a firm footing has been planted on actual practical technology and on realistic future scenarios rather than on mere speculative ideas.

## On the day of October 24....

### ANTONIE VAN LEEUWENHOEK

Beevi Zaibin, I<sup>st</sup> Semester, BSc



### ANTONIE VAN LEEUWENHOEK

Antonie Philips Van Leeuwenhoek was a dutch tradesman and scientist who was the first man to see bacteria. He is commonly known as "THE FATHER OF MICROBIOLOGY" and considered to be the first microbiologist. He is best known for his work on the improvement of the microscope and for his contribution towards the establishment of microbiology.

Most of the "ANIMALCULES" are now rejected to as unicellular organism, through he observed multicellular organism, though he observed multicellular organism in pond water. He was also the first to document microscopic observations of muscle fibers, bacteria, spermatozoa, and blood flow in capillaries. Van Leeuwenhoek used samples and measurements in units of water. He also made good use of the huge lead provided by his method. He studied a broad range of microscopic phenomena, and shared the resulting observation freely with groups such as British Royal society. Such works firmly established his place in history as one of the first and most important explorers of the microscopic world. Antonie Van Leeuwenhoek was one of the first people to observe cell, much like Robert Hooke. Van Leeuwenhoek main observation are:

- Infuorin ( Protists in Modern zoological classification) in 1694
- Bacteria ( Larger Salenomonads from the human mouth ) in 1683
- The banded pattern of Muscular fibres in 1682