



D Y PATIL  
INTERNATIONAL  
UNIVERSITY  
AKURDI PUNE

# SCINION

Minions of Science

VOL 1  
SEPT 2021

**COMOPOLIS**  
**MINIOSTER**  
***SCINIBYTE***  
**ANIFACNION**



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# Acknowledgement

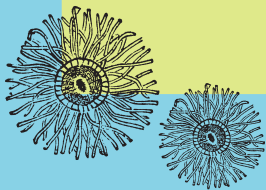
We would like to express our gratitude to our Vice Chancellor, Professor Prabhat Ranjan and Director, Professor Shashi Singh, for their invaluable counsel and unwavering support in inspiring us to create the e-magazine.

Furthermore, we would like to express our gratitude to all of the Faculty Advisors from the School of Biosciences and Bioengineering for their invaluable help and contributions to the magazine's successful completion.

Last but not least, we would like to express our heartfelt appreciation to all the students for their outstanding scientific communiques, which have served as the magazine's "glitter to gold."

Thanks a ton to everyone who is reading! We hope you will like this small place of science we tried to construct.

Regards,  
Editorial Board





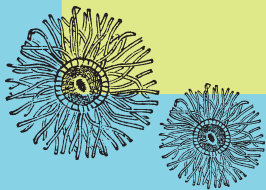
# Preface

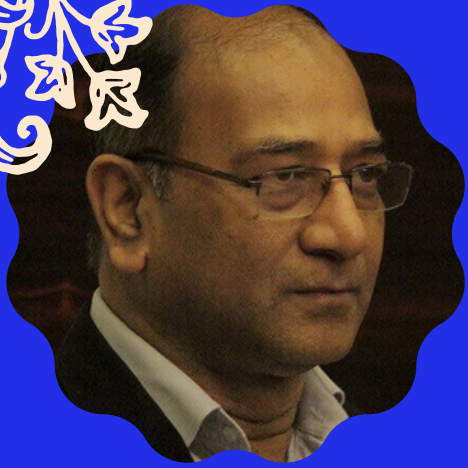
Science communication is involved in everything from our personal decisions about health care, which cars we want to buy, or whether it is healthy to eat stuff that has been out of the fridge all day, to larger social judgments like military technology, online privacy, or stem cell research. It entails much more than simply disseminating scientific information. It helps to build government policy on science and technology, develop interactions between the public and scientists, and the creation of science stories in the media, as well as the investigation of how people learn about and engage with science. Today, science communication is a large area of research and activity. It is therefore an important subject, helping students learn about science, understanding science problems when they get the news, and having a voice in discussions about its role in people's lives.

The main aim of scientific communication is to spread scientific information in different and attractive forms, such as infographics, posters, blogs, illustrations, animations, etc. It helps in building the gap between scientific knowledge and the general audience. Anybody can understand what science is when we make use of a very simple language and methods to transfer information. Therefore, as part of the Scientific Communication course project, the students of the School of Biosciences and Bioengineering have taken various means to communicate science, including blogs, animations, facts, comics, illustrations, posters, and many more. Thus was born SCINION, a bi-yearly magazine showcasing selected projects from the course, thereby creating a fun space exclusively for scientists and technocrats and attracting more students to get involved in communicating science.

The purpose here is to introduce science in an entertaining format which depicts the facts science can astonish us with. The magazine includes scientific information in the form of blogs, mechanisms have been explained in the form of comic strips, awareness issues in the form of posters and interesting and commendable remarks in the form of facts. The magazine is all about scientific literature explained in the world of Minions in a comprehensible and easily digestible appearance.

We hope that you will enjoy every bit of SCINION.

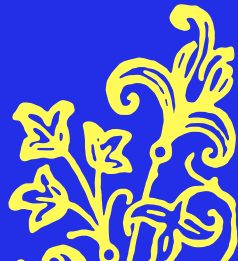




## *From Vice Chancellor's Desk*

I am delighted to know that the students of School of Biosciences and Bioengineering have initiated a Scientific Communication Magazine, SCINION. It is a unique experiment to understand and elaborate scientific and technical concepts to the general public, something very close to me personally. I am excited to see the collaboration of students during the times of this pandemic and come up with exciting contents in the form of comic strips, blogs, animations, illustrations, etc. I am sure that this e-magazine will help students realize their potential in comprehending and assimilating different concepts of science and technology and presenting it to the readers in a digestible way. SCINION exemplifies the vision of DYPIU of extending knowledge via research and teaching. My best wishes and good luck to everyone involved in this venture.

*Professor Prabhat Ranjan*





## *From Dean's Desk*

At the outset let me congratulate our graduate students for taking up this initiative of compiling a magazine/newsletter of their creativity in Science during the course of their learning. Their efforts to explain some complex science issue in the form of comics/arts/ blogs is certainly commendable. So welcome to the world of Scinions- Inaugural issue of our in-house biannual magazine of students of Biosciences and Bioengineering of DYPIU.


As a part of science communication course the students are asked to take up any of the many modes of expressing an idea and make things simple and entertaining for the readers; and their credible effort are out for you to see. The curriculum consists of speaking and presenting on scientific topics, information dissemination via infographics and posters, writing scientific reviews, research articles, blogs and news and promoting science via social media. I would like to thank Dr. Surabhi Sonam for guiding them through the process and leading them to the forefront of compiling, editing and publishing. My congratulation to all the students whose work has found a page in the issue and they ought to be proud of their achievement.

Finally I invite you to browse and enjoy through the inaugural issue of the SCINIONS and end up looking for more.

*Professor Shashi Singh*



# From Scinion's Desk!



"Scinion has birthed out a shelved project of some well-minded students who wanted to make website out of their scicomm projects. After the shelving of the website, I realised I had a lot of material in the form of student submissions for the Scientific Communication course which needed to be brought to a larger audience. They were the perfect material to make science more accessible to people. Hence, I decided to put together a group of students who could collate this material into an e-magazine. And in the very first discussion, we had "Scinion" thanks to the poster of the Minions on the wall of one of the student editors.

It has been a great experience working with all these wonderful and enthusiastic young editors. I know this is our first volume, but I also know that there are many more volumes to come. Good luck, Scinion!"



*Dr. Surabhi Sonam*

Head

Dept. of Bioengineering

# A Poetic Start..!

## The Cell

Who are you  
If you are not me?  
Made of same cells,  
How different can we be?



It grows into you  
It grows into me  
It makes every living  
Being that we see



It is miniscule  
You need a microscope?  
There is no calamity  
That it can't cope

It's organs are together  
Working in synergy  
They are the creators  
and destructors of energy

It divides  
It propagates  
To regulate itself  
It has control gates



Once done, it dies  
within you  
If not dying  
It might kill you



It is a packet  
Of power in microns  
It is the queen  
We are just its pawns

By

**Dr. Surabhi Sonam**

Faculty Advisor  
Scinion



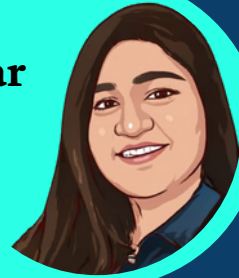


# *Meet the team*



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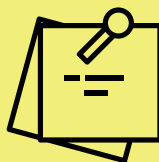
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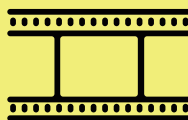
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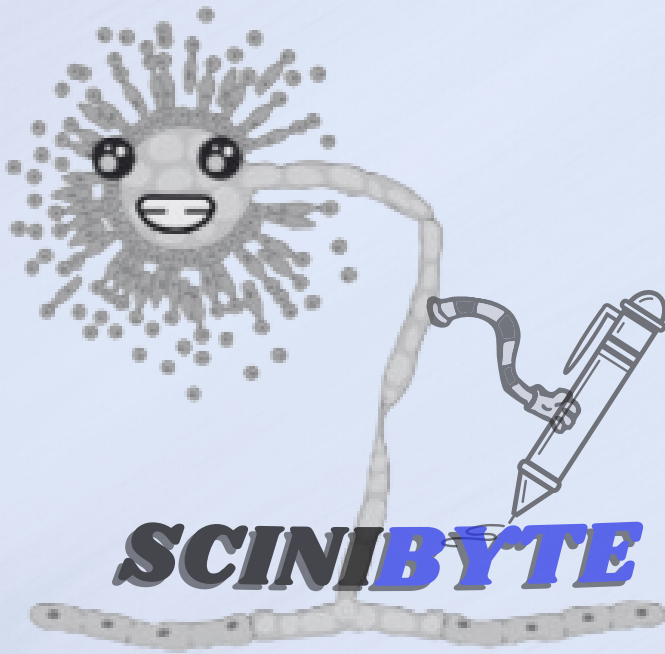


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**BY SRISHTI NAND****PRN- 20200901007****S. Y. B. TECH BIOENGINEERING**

# HUMAN MICROBIOME AND IT'S ROLE



*The microorganisms living collectively within the human body is known as human microbiome . It consists of bacteria , fungi, archaea and eukaryotes and among these bacteria is mostly studied .*

Every human has its own unique microbiome which they acquire from their mother during birth. Microbes co-evolve with their host and adapt to environment within the body. They help in maintaining and sustaining the health. In the body respiratory tract , nasal cavity and skin mostly inhabits aerobes whereas anaerobes are mostly found in gastrointestinal tract.

The oral microbiome (microorganisms in oral cavity) protects the body against the invasion of undesirable stimulations outside. The gut of the body has highest concentration of microbes. These microbes influences the developmental aspect of the immune system and activates the pro-inflammatory Th17 cells and regulatory T cells in the intestine. They also helps in digestion, nutrient production, detoxification, protection against pathogens. The intestinal microbiome improves and maintain gastrointestinal function. Bacteria such as Bifidobacterium, Bacteroides and Enterobacteria helps in vitamin production. The colonic microbiome helps in breaking down the complex dietary constituents and producing butyrate from fermentation to protect large bowel from cancer. The respiratory tract is colonized by specialized organisms which prevents pathogens from overgrowing and disseminating towards lungs. The organisms also provide cues to the host immune system which is vital for immune training, organogenesis and maintenance of immune tolerance. High counts of Bacteroidaceae and anaerobic bacteria are found in an allergic person which interact with and degrades external contaminants. The female genital tract harbours microbes which induces innate immunity for protective mechanism. Species of Lactobacillus is mostly found in the healthy women. These microbes produce lactic acid and hydrogen peroxide which helps to lower the vaginal pH. They also promote the production of bacteriocins which reduces the colonization by other pathogenic organisms (like HIV and STD).

Microbes are very helpful and are part of our body as they contribute to the health and wellbeing. Human microbiome is constantly evolving and is determined by many factors. It is important to understand their importance.

**BY VARAD SHIVAJI AKHADE**  
**20190101038**  
**T. Y. B.SC. BIOTECHNOLOGY**

# BLACK HOLES: THE MYSTERIOUS GOLIATHS OF SPACE

## What is a Blackhole?

A black hole is a cosmic body where there is a large gravitational pull that even light cannot escape through that body. The gravitational pull is so strong here because the matter is been squeezed into a very tiny space. This cosmic body may be the result of the dead star. As no light can escape through the black holes, we cannot see black holes. It is called “black” because it absorbs all the light that hits it and reflects nothing so it appears to be black, just like a perfect black body in thermodynamics.

Details of the structure of a black hole are calculated from Albert Einstein’s general theory of relativity. The singularity (a one-dimensional point that contains a huge mass in an infinitely small space) the centre of a black hole and is hidden by the object’s surface, the event horizon. Inside the event horizon, the escape velocity (the velocity required for matter to escape from the gravitational field of any cosmic object in space) exceeds the speed of light, so that’s the reason why not even light rays can escape through it. The radius of the event horizon is called the Schwarzschild radius, named after the German astronomer Karl



*Ship approaching event horizon  
(scene from the movie interstellar  
released in 2014)*

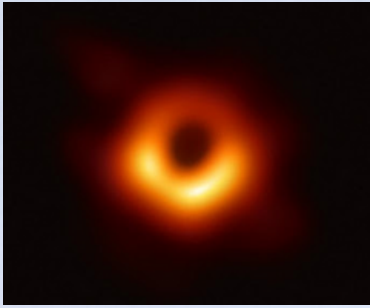
Schwarzschild. The size of the Schwarzschild radius is proportional to the mass of the collapsing star. For a black hole with a mass 10 times as great as that of the sun, the radius would be 30 km (18.6 miles).

## How scientists know that there is Blackhole if it is black?

Since black holes are undetectable, they are found by the way in which they influence other matter close to them. The presence of a black hole can be worked out by tracking the movement of a group of stars that orbit a region in space. On the other hand, when gas falls into a black hole, the gas spirals inwards, warming to exceptionally high temperatures resulting in the emission of high amount of radiation. And there is one more way of detection that when a black hole and a star are near to one another, high-energy light is made. This sort of light cannot be seen with natural eyes. Researchers use satellites and telescopes in space to see this high-energy light and detect the presence of a black hole.



telescopes in space to see this high-energy light and detect the presence of a black hole.



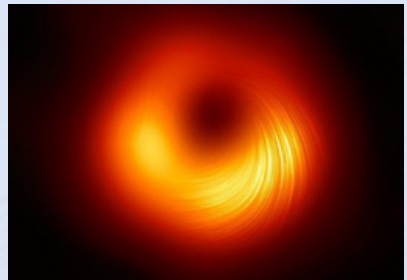
***Supermassive black hole at the core of M87 galaxy. The first direct image of black hole, released on April 10, 2019.***

### Supermassive black hole

A supermassive black hole is the largest type of black hole known to us till now, it has a mass of more than a million to billion times that of the sun. Observational proof demonstrates that pretty much every galaxy has a supermassive black hole at the galaxy's centre. One such supermassive black hole, Sagittarius A, exists at the centre of the Milky Way Galaxy which is the galaxy in which we live. Observing stars orbiting the position of Sagittarius A exhibit the presence of a black hole with a mass identical to more than 4,000,000 Suns. (For these observations, American astronomer Andrea Ghez and German astronomer Reinhard Genzel were awarded the 2020 Nobel Prize for Physics.)

Supermassive black holes have been identified in different galaxies also. In 2017 the Event Horizon Telescope got a picture of the supermassive black hole at the centre of the M87 galaxy (which is 55 million light-years away from the earth). This black hole has a mass equivalent to six and a half billion suns. It was the first black hole to be imaged directly.

The presence of many black holes, each with a mass equivalent to 10 billion times Suns, can be deduced from the energetic consequences for gas twirling at incredibly high velocities around the centre of NGC 3842 and NGC 4889 (galaxies near the Milky Way).



***Latest image of Supermassive black hole at the core of M87 galaxy, image showing the magnetic field lines around the black hole, released on March 24, 2021.***

**BY SHIVANGI SANGANERIA**  
**PRN- 20190101029**  
**T. Y. B.SC. BIOTECHNOLOGY**



## THE FRIEND INSIDE US

*This partnership that we are dealing with comes since the day we get into our mother's womb and leaves the day we leave our body.*

Microbe microbe microbes  
What is this that the heart throbs?  
It is my friend that lives inside me,  
Protects me and cares for me!  
It makes my immune strong,  
So that I can get along,  
With every day to day activity,  
With power, smile and feasibility!  
Though it cares, still my mind questions  
Are we the boss or are we the servants?  
Are the microbes friends or are they enemies?  
They work according to us or we work according to them,  
The questions keep bothering but the instincts keep admiring the  
support they give us and the nourishment we give them. It's a deal  
between friends! Feed them right and they feed you right  
Feed them wrong and they make you sick  
Win – win or lose – lose, you choose!

Imagine one Sunday evening, having snacks and out of nowhere you notice a little bug in the ground and you start pondering, do we have bugs inside us too? This is what my blog includes about- A bug inside us leading to the germ file story. Let's begin with a note

A note from Dr. Joe Hanson:

Sure, you feel human, but that's only mostly right. In and on your body, you're outnumbered by ten times when it comes to microbes. And many of them have essential duties that we just couldn't do by ourselves. Here's a trip through your microbial inner universe- what we call the "microbiome"

Being an individual we always imagine ourselves to be alone but are we actually alone? The answer is NO! We have millions of microorganisms in us, starting from the surface of the skin to the inside of the stomach, there are different microbes surviving

## SCINIBYTE

In us. What's surprising? The surprising thing is that each different surface acts as an environment for the microbe. Could you feel the depth? Your own body acts as an environment for the organisms inside you.

Each of these microbes perform their daily functions or say tasks, which means they are doing their jobs inside us and for that they also need a pay. Hahahaha...it sounds both weird and exciting together.

Let's know what is the job they perform and then also have a glance on what to they get in return, i.e, their pay for the job?

The job for each microbe is different Like for example- take "Cellulosic bacteria" this bacteria breaks down cellulose into simpler sugars inside our stomach. And the pay it gets is the nutrients which we consume from foods. They are like friends to our body.

A good functioning bacteria leads to a good functioning body. Let's elaborate this

The microbes have a lot of advantages and it helps our immune stay strong. These are the good bacteria that keeps the metabolism of the body consistent and unwavering.

The microbiome is essential for human development, immunity and nutrition. The bacteria living in and on us are not invaders but beneficial colonizers. Autoimmune diseases such as diabetes, rheumatoid arthritis, muscular dystrophy, multiple sclerosis, and fibromyalgia are associated with dysfunction in the microbiome and all these are controlled by them. Both inside and out, our bodies harbour a huge array of micro-organisms. While bacteria are the biggest players, we also host single-celled organisms known as archaea, as well as fungi, viruses and other microbes – including viruses that attack bacteria. Together these are dubbed or named as the human microbiota. Our body's microbiome is all the genes our microbiota contains which means that the whole thing depends on to a little organism inside us that cannot even be seen without the help of a microscope.

Where do my microbes come from? Do I just pick them up from my surroundings?

Partly yes! But it is more complicated than that because it is still a little bit controversial but for the most part it is thought that we are sterile when we are in utero and as we are being born, as we emerge through the birth canal from our mums, we get this handover bacteria as an asset from them, proving that everything we receive is because of our parents. The first gift from our parents to us.

By now, we came to know about what are microbes, how we get them, how is it useful to us and why is it important. Before coming to the end of the blog let's give it a good quote-

"Every day we live and every meal we eat we influence the great microbial organ inside us - for better or for worse"

BY VANSHIKA GARG

PRN- 20190101024

T. Y. B.SC. BIOTECHNOLOGY

# DESIGNER BABIES – ARE THEY THE FUTURE?

## What is a Designer baby?

Designer baby is a baby whose genes have been modified by gene editing. Gene editing is a technique used for modifying the DNA. It would enable parents to choose the intellect, athletic ability, musical ability, and eye and hair colour of their new baby. It can also help to eliminate certain diseases which run in the families and increase life expectancy.

## Gene editing

The method of making changes to DNA is known as gene editing. This is achieved in the case of designer babies by either deleting small portions of the original genome or inserting new DNA segments into the genome.



Source: NIH Image Gallery / Flickr



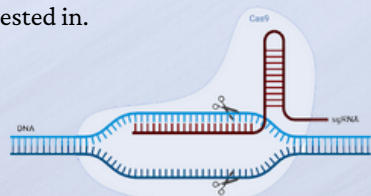
*What if parents could customize their baby much like choosing a car with the desired features? It sounds like science fiction, but the reality is not as far as you think.*

While there are many methods for gene editing, the CRISPR-Cas9 system is the most common and generally accepted. In scientific terms, CRISPR, stands for clusters of regularly interspaced short palindromic repeats. CRISPR allows scientists to alter the DNA of any organism.

## How does CRISPR-Cas9 work

Consider it similar to editing a word document, where you can highlight and correct a misspelt word or delete and replace a word.

CRISPR is made up of two components: the Cas9 protein and a guide RNA. The Cas9 protein acts as the scissors and cuts DNA that scientists want to edit. The guide RNA is the brains of the process as it recognizes the DNA to be edited. The CRISPR-Cas9 system looks for segments of DNA that are similar to what we are interested in.



**CRISPR-CAS9 SYSTEM  
FOR GENOME EDITING**

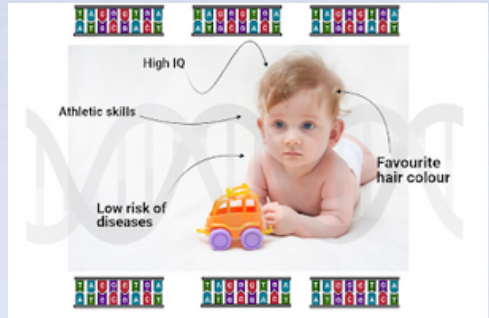
## SCINIBYTE

Let's take an example, if parents are looking for the DNA sequence that handles eye colour, we would program CRISPR to find that sequence. Once identified, the Cas9 protein cuts the unwanted sequence and replaces it with its own DNA sequence. A guide RNA is used to do this. Thus, we can change original eye colour to a different one. This is known as creating designer babies. However, it is essential to consider the ethical issues raised by such a process, as well as the consequences.

### Ethical concerns

As it has been rightly said, "science is a boon as well as a bane to mankind", if this technology is misused, it could pose a danger to humanity. There are numerous disagreements about whether or not human genetic engineering should be practised. For ethical reasons, the practise has been banned in many countries around the world.

While gene editing in human embryos may one day prevent some severe genetic defects from being passed down from parents to their offspring. But when it comes to editing embryos, one thing is certain: mistakes can happen. Thus, it's somewhat risky presently. Other worries include scientists' fears that genome editing would have unpredictable implications on future generations, such as genetic mutation and irreversible changes that could be dangerous to humanity. Many people are concerned, about the possibility that in the future, parents or doctors may be able to dictate



characteristics such as a child's gender, height, creativity, intelligence or intellect, giving those who can afford gene editing an advantage and eventually contributing to inequality. At the end, it will allow science to direct the human race's evolution which is against nature.

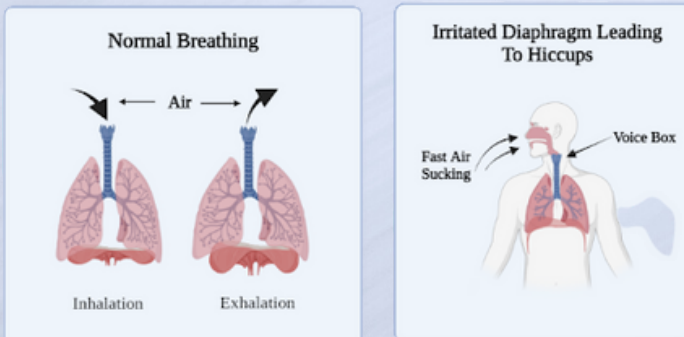
### What the Future holds

The field of gene editing is still in its early stages. It is critical that we continue to act with extreme caution, paying close attention to ethical issues. The only thing that can be hoped for, is that the technology be used responsibly. However, it is possible to imagine a world free of some of the most devastating genetic diseases. To perform gene editing research and practise, researchers must first obtain a licence from the government. If future lies in such technology, then there has to be laws to curb the negative impacts.

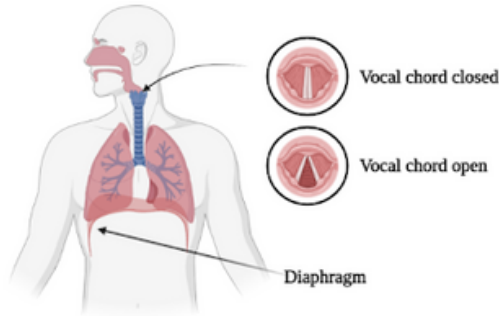
# HICCUPS - FUNNY BUT ANNOYING TOO

Hiccups sound funny, but when they go for a long time, they are annoying. The hiccup is an onomatopoeic name which comes from the sound made by the unexpected closure of the vocal cords approximately 35 milliseconds after the forceful contraction of the respiratory muscles. We all get hiccups, but nobody knows how to actually stop them. Everyone has their own techniques to stop them. Some do it by holding their breath for some time, or some drink a glass of water very quickly. Hiccup sounds like "hic", but how does this sound come? How do we get hiccups? Ever wondered?

Hiccups occur due to the diaphragm, which is a dome in shape present below the lungs and above the stomach, getting irritated. Usually, the diaphragm contracts when we inhale and relaxes when we exhale. But when something irritates the diaphragm, it forces you to suddenly suck air into your throat, which hits your voice box. Due to this, the vocal cords suddenly close, creating the "hic" sound. There are 3 types of hiccups classified according to the length of time they last. An acute one lasts for less than 48 hours, a persistent one continues for more than 2 days and intractable hiccups last for longer than 1 month. Hiccups are rhythmic and are medically known as synchronous diaphragmatic flutter (SDF) or singultus. They can occur individually or in bouts. The National Organization for Rare Diseases (NORD) describes hiccups as "an involuntary spasmodic contraction of the muscle at the base of the lungs (diaphragm) followed by the rapid closure of the vocal cords."



## Hiccups Mechanism



When the diaphragm gets irritated, it forces to suddenly suck air into throat, which hits the voice box. Therefore, the vocal cords suddenly close, creating the "hic" sound.

Why do hiccups occur? There are multiple reasons, including both emotional as well as physical. Commonly, the causes include stress, swallowing air while sucking candy or eating chewing gum, drinking carbonated drinks, eating too quickly or feeling nervous or excited. This all leads to actual irritation of the nerves connecting the brain to the diaphragm. Hiccups don't last a long time, they are temporary. But sometimes it remains for a long time due to frustration of the nerves connected to the diaphragm. If it lasts longer than 48 hours, it is considered persistent, and the person should get to the doctor. It could be a sign of a more severe medical condition. This more commonly occurs in men than in women. The longest recorded case of hiccups lasted 60 days. A doctor may prescribe medications that should be taken properly to get rid of hiccups. Hiccups can be prevented by avoiding overeating, eating too quickly, or drinking too much too quickly. Prolonged hiccups can lead to complications such as weight loss and dehydration, because of difficulty eating; insomnia if the hiccups occur during sleeping times; fatigue due to irregularity in eating and sleeping; communication problems, leading to clinical depression and also leading to delayed wound healing. Other complications can include irregular heartbeat and gastro-esophageal reflux (GERD). Home remedies for hiccups include patting on the back, drinking warm water, placing sugar on the tongue, biting a slice of lemon and holding breath. There is a saying in India, 'that when we get hiccups, someone is missing us.'

**BY SALONI KARANI**  
**PRN- 20190101003**  
**T. Y. B.SC. BIOTECHNOLOGY**

## A LAB IS THE BEST BURGER JOINT



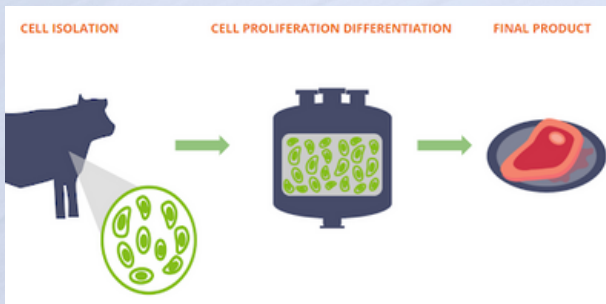
**- IT'S SAFER FOR YOUR WALLET AND THE ECOSYSTEM TO GROW MEAT CELL BY CELL**

Consider this. You illustrate to your grandchildren at the dinner table 40 years from now that meat was once grown on living beings. Beings who were raised, fed, shipped, slaughtered, and diced up; all for a meal that could be tainted with dangerous bacteria, growth hormones, and antibiotic residue. As they would consider such an expensive, barbaric, and resource-intensive form of food production to express confusion and disgust. You all tuck into dinner sausages made at the local meat brewery by feeding nutrients to cow cells within big, steel bioreactors.

It could sound like something out of a science-fiction novel, but it's a scenario that is becoming a reality sooner than we expect.

To claim that modern meat processing is problematic is an understatement. It's an industry at the heart of a very significant environmental problem, from climate change and water depletion to deforestation and ocean ecosystem collapse. It is also escalating a range of global health crises, including the growth of non-communicable diseases, the spread of antibiotic-resistant bacteria, raising food prices.

All of these issues can be addressed by “clean” or “cultured” meat, which is grown by feeding nutrients directly to animal cells collected via a tiny biopsy.



**FIGURE: PROCESS OF CLEAN MEAT IN A NUTSHELL.**



The process of producing clean meat starts by taking a biopsy of cells from an animal, in this case, a cow. This biopsy is about the size of a grain of rice and can be performed with a local/topical anaesthetic to minimize any discomfort to the animal, of course, the animal remains alive after the procedure! The cell biopsy is then dissociated and seeded into a bioreactor, a cell culture device to proliferate, divide and grow. In this way, we can make many millions of cells from each cell biopsy. Once the cells have grown to confluence; they will be transferred to the 2nd growth system that contains some type of scaffolding to promote cell differentiation and growth of the final product with a recognizable texture and shape.

IMPACT CATEGORY	UNIT	CLEAN MEAT BURGER	BEEF BURGER	DIFFERENCE
Aquatic Eutrophication Potential	gPO4-eq	1.3	15.1	-92%
Global Warming Potential	Kg CO2-eq	3.5	30.6	-89%
Land Occupation*	m2.y	2.5	62.0	-96%
Water Consumption	liters	106.8	850.1	-87%

\*Land occupation is reported at an LC1 level. Based available LCA related information on food production, in accordance with ISO 14044 standard.

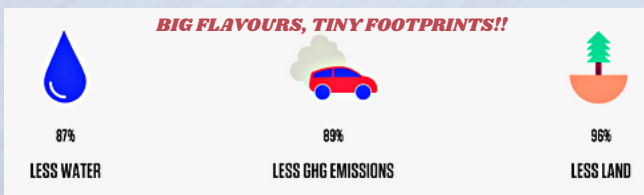
**FIGURE:  
COMPARISON  
BETWEEN  
A CLEAN MEAT  
BURGER AND A  
BEEF BURGER.**

If growing meat in a bioreactor appears to be unnatural, one should reconsider how meat is produced today. Animals whose genes have been manipulated through selective breeding to change their physiology and growth rates are stored in supermarket refrigerators. Some are given artificial hormones. Many live in overcrowded sheds in their waste and are given antibiotics to prevent infections that are ubiquitous in such unnatural and unsanitary conditions.

Clean meat is identical to animal flesh because that is exactly what it is but, it is free of drugs, animal suffering, and the need for vast swaths of land and water.

So, given that we can make delicious, juicy, sizzling meat that is a win-win situation for everyone, why wouldn't we embrace it as the future of food? Just as fossil fuels are being replaced by electric automobiles, innovations such as 'clean meat' will replace factory-farmed meat, with enormous positive consequences for humanity.

Creating a truly safe and sustainable food system can become a reality as more scientists, entrepreneurs, investors, activists, and governments bond together to advocate this revolutionary technology.



**BY KANHAIYA DUBE****PRN- 20180101009****BSC. BIOTECHNOLOGY (2018 BATCH)**

## TREASURE OF BEAUTY THERAPIES FROM ANCIENT INDIA



**HERBS USED IN THE  
COSMETIC FORMULATIONS**

### *Cosmetic therapies and formulations from ancient literature*

Cosmetic therapies have become trend now, was it like this in the past times also?

Answer is, “yes”

From long time, people from the different cultures and civilizations are obsessed with the beauty and keeping themselves younger. They have undergone different beauty therapies and cosmetics to look beautiful. In all this skin is the most important part. Our ancient skin care practices were interwoven with the seasons and normal rituals of the life. All these practices are well described in the Ayurveda, Skanda Puranas, and Samhitas.

Our ancestors wrote beauty therapies in Ashtang hridaya, a book written before 1500 years. There were six different formulations which was for the six different seasons. In Garud purana various beautifying yogas are mentioned, while performing Chandrayana vrata for acquiring beauty and popularity is also mentioned in the Anushasan parwa of Mahabharata.

Beside all these, ayurvedic literature says, “human body is microcosm of five elements space, air, water, fire and earth (pancha tatwa) itself it is mini universe” these altogether forms Prakruti. These five elements combine to form three Doshas Vata, Pitta, and Kapha”, these Doshas have different impact on the skin, and one needs to balance it. Change in the environmental factors brings adverse effects that is Vikruti. This Vikruti can be in form of pimples, acne, wrinkles, scars, marks, pigmentation, unwanted hairs etc. For this problem well known ancient physician of India “Sushruta” wrote different formulations and therapies in his samhita called as “Sushruta Samhita”. Sushruta made known detailed cosmetic therapies of skin and hair in his Samhita. Science behind these therapies is, it includes passage of the ingredients across the skin. These therapies further divides into skin, hair, nail scalp and other parts of the body from cellular level to the surgery level.



**Three doshas of prakriti**

### Skin treatments

Sushruta described Shvitra (vitiligo), Nyaccha (mole or spot on the body), Vyanga (reduced glow on face), Nilika (mole), Tarunyapitika (pimples) etc. skin conditions. Avalgujadi Lepa, it is prepared by mixing aval guja seeds (psoralea corylifolia), haratala (arsenic trisulphide), and cow urine. This lepa is useful in many skin disorders and helps in regaining colour of the skin.

Also puncturing the veins of the foreheads and rubbing it roughly for few of the skin conditions, these treatments are referred. Moreover application of paste of the bark of the trees containing milky sap with the different formulations of Bala, Atibala, Yastahva and Rajani. Then Paste of tusk (canine tooth) of a boar mixed with honey and Ghee or paste of Kapittha and Rajadana is also beneficial.

Apply paste of fruit of Rohini soaked in the goat's milk for seven days, for the hyperpigmentation (pandukarma), and for the hypopigmentation (krishnakarma) application of paste of bhalataka oil mixed with ash of the hoof of the domestic animals in marshy region. Sushruta referred acne as Yuvanpidika, and wrote Shodhan chikitsa (treatment of purification) for its cure. Again Vamana and application of paste of Vacha, Rodhra, Saindhava and Sarshapa was the part of treatment.

### Hair treatments

Hairs are ornament one needs to take good care of it. By the imbalanced hormones and growing age males have to face baldness. Samhita consist of different cosmetic formulations in like, combination of the Hastidanta and Rasanjana. Then ash of the skin, hair and hoof of the four footed animals mixed with the oil and its application. Also Kasis that is, leaves of Naktamala soaked in the juice of Kapittha is also mentioned.

In Kshudraroga, Indralupta a disease characterized by the loss of hairs, for its treatment massaging and fomentation of scalp followed by the rupturing of the veins and application of the paste of the Maricha, Manasheela and Tuttha or Tagar and Devadaru.

### Hair removal therapies

People face problems with the unwanted hairs. Hairs were removed from the body for the treatment purpose as it causes problem in the wound healing. For these, formulations of depilatory creams are written in ancient literatures like, paste of oil of Bhallataka and milky sap of Snuhi is best to get rid of the hairs. Then ash of tail of Agargodhika (house lizard) along with the Rambha (kadali), ala and seeds of Ingudi mixed with the oil and cooked in sunlight, its application removes hairs. Also paste of ash made from kadali and Dirghavrinta was also used to remove unwanted hairs.



*Photography by Kanhaiya Dube*

Except all these treatments, use of sandalwood (white and red) for medicinal, skin care practices, and makeup was done. Today it is proven that sandalwood moisturize, protect skin from sunrays and active against germs. Its mixture with the turmeric and other ingredients was used as the face mask and also as body scrub.

The ancient Indians were fan of the mud treatments, then bath with the herbal flowers, milk for the lubrication of the skin, without clogging the pores. Steam treatments with the sesame oil and herbs which eliminates the toxins from the skin, was called as aromatherapy.

Human beings have thirst of being admirable and they started following beauty therapies from the initial period of civilization. Even the Gods described in the Vedas are adorned with divine beauty.

These treatments were mentioned in the holy ancient literature to enhance beauty, but this was not just the part of beautification while it was performed to achieve merit (punya), health, wealth and eternal happiness (param anand).

## SCINIBYTE

**BY DEEKSHA GARG**  
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# INCREASING IMPORTANCE OF GUT HEALTH IN THE AFTERMATH OF COVID-19



Since last year, when the entire world was struck by a massive health crisis as a result of the Coronavirus illness, there has been an increasing focus on people's nutrition and lifestyle choices, compelling everyone to prioritize their health and well-being. COVID-19 has affected over 100 million people worldwide, with the worst-affected countries being United States, India, Brazil, Russia, United Kingdom, and France.

Among the many symptoms of COVID-19, some notable ones are nausea or vomiting, diarrhea and intestinal discomfort. This very fact has arisen the quest to find an answer to the following question, "What if SARS-CoV-2 and the microbes living inside our intestines have a significant link and whether this connection can be used as a potential tool to combat further infections?" In fact, many studies are being conducted to understand this very link. People with underlying medical disorders such as high blood pressure, diabetes, and obesity have a higher chance of severe COVID-19. And the risk of major consequences and hospitalization increases with age, with the older population being the most vulnerable. However, both of these characteristics, old age and chronic illnesses, have been linked to a change in gut microbiota i.e., the different types of microbes present inside our gut. Alterations in the gut microbiota, also referred to as "gut dysbiosis," have been linked to a variety of long-term diseases and disorders, including Irritable Bowel Disorder, type 2 diabetes, depression, and cardiovascular diseases.

Many people who survive their first encounter with the disease go on to have puzzling and sometimes crippling symptoms called "long COVID" for months. As a result, it's proposed that people who have COVID-19 and leave the hospital require continued treatment and rehabilitation to assist them recover. Long COVID can be exacerbated by abnormalities in the type of bacteria prevalent in the gut, according to studies.

The gateway to our cells for the entry of the corona virus is the protein called angiotensin converting enzyme 2 or ACE-2. This ACE-2 receptor protein is found in the lungs as well as in our intestines, indicating that the virus might have a significant relation with the gut microbiota.

*Copyrighted and Published Under: - BugSpeaks® powered by Leucine Rich Bio Pvt Ltd., South Asia's first microbiome company.*

## SCINIBYTE

A study was conducted to see the changes in the types of microorganisms present in the faeces of 15 Hong Kong patients with SARS-CoV-2 infection during hospitalization and its relationship with severity and presence of the viral particles in their faeces. Their samples had significant alterations compared with controls (healthy individuals), that means they had more opportunistic or 'bad' microbes than the beneficial ones and this imbalance persisted even after SARS-CoV-2 was no longer present in their bodies and resolution of respiratory symptoms. This indicated that even after recovery, there was a pronounced imbalance in the gut, which can potentially impact the lungs, but also other organs as well as the immune system. So, it becomes important to keep higher levels of good bacteria in our bodies than the pathogenic ones. Diet, unsurprisingly, has a substantial impact on the composition of bacterial communities in the intestine.

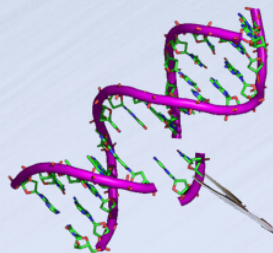
It is known from several studies that plant based foods, containing high fibres, have a beneficial impact on our gut health. Healthcare practitioners who ate a plant-based diet had a 73% lower risk of moderate to severe



COVID-19, and those who ate a plant or fish based diet had a 59% lower risk of being very ill. The study also argued, despite having efficient healthcare facilities, the severely affected countries in the pandemic are the western countries, indicating that one of the underlying reasons behind this is the type of diet and lifestyle choices. Western diets containing processed foods with high fats, oils and refined sugars are major triggers for poor gut health. As a result, eating a more fibre diet, supplementing with probiotics, prebiotics, or synbiotics on a regular basis, exercising regularly, and most importantly, having our gut health examined becomes vital.

Understanding the situations from the ground up is the need of the hour. Many investigations have yielded significant results regarding this continually changing and evolving pathogen. When a virus replicates in a host cell, it has a chance of mutating, which means it can make minor changes that affect the expression of certain proteins. Those changes can sometimes become fixed traits in the viral population, which helps them to survive in the host population. This suggests that the more copies the virus makes, the more it spreads and the more it can alter, adapt, and learn to thrive in that environment in the form of variants. And therefore, people are constantly encouraged to get vaccinated and continue maintaining all the necessary protocols and not let "pandemic fatigue" set in at any cost. With all the growing evidence pointing towards a link between host immunity, the microbes living inside us and the covid-19, it is of utmost importance for everyone right now to practise towards making our gut healthy and strong.

**BY SONALI D. PANDEY**  
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## GENETICALLY MODIFIED FOODS - ARE THEY SAFE?

Biotechnology is giving us a wide scope of alternatives for how we can utilize farming and commercial forestry lands. Researchers can do some stunning things with qualities, from saving papayas from elimination, to making apples last more prior to becoming brown, to making variations of harvests that diminish pesticide use. A portion of these things might sound unrealistic and I comprehend in case you're suspicious. What are genetically modified foods? How does this work? Is it safe?

### What are GM Foods?

Genetically modified foods (GM foods), called as bioengineered foods are foods made from organisms that have had changes introduced into their DNA victimization the strategies of gene-splicing. Gene-splicing techniques provide the introduction of recent traits yet as bigger management over traits when put next to previous strategies, like selective breeding and mutation breeding. Genetically modified foods have been designed for protection from microbes, herbicides and for better nutrients profiles. Most food changes have chiefly centred on cash crops wanted by farmers like maize, soybean canola, and cotton.



### Process

Creating genetically modified foods are multi-step process. The primary step is to spot a useful gene from another organism that you just would really like to feature. The factor are taken from a cell or unnaturally synthesised, then combined with different genetic elements, as well as a promoter and terminator region and a selectable marker. Then the genetic components are inserted into the targets genome. Using microinjection, DNA is usually inserted into animal cells where it'll be injected through the cell's nuclear envelope directly into the nucleus, or through the infective agent viral vectors. In plants the DNA is usually inserted using Agrobacterium-mediated recombination, biolistics or electroporation. As just single cell is transformed with genetic material, the organism

should be regenerated from that single cell. In plants this is often accomplished through tissue culture. In animals it's necessary to confirm that the inserted DNA is present within the embryonic stem cells. Further testing using PCR, Southern hybridization, and DNA sequencing is conducted to verify that an organism contains the new gene.

### Health & safety

There is no proof that a crop is dangerous to eat simply because it is GM. There can be risks related to the particular new sequence introduced that is why every crop with a brand new characteristic introduced by GM is subject to close scrutiny. Before any food created victimisation GM technology is allowable onto the market, a spread of tests needs to be completed. Opponents claim that long-term health risks haven't been adequately assessed and propose various combinations of additional testing, labelling or removal from the market. "Science" supports the protection of current GM foods, proposing that every GM food should be judged on case-by-case basis claim by the advocacy group European Network of Scientists for Social and Environmental Responsibility (ENSSER). The results from these tests, together with results from animal feeding trials, are contemplate by the authorities responsible for decisive the protection of each new GM product. This makes GM new crop varieties as safe to eat as new non-GM varieties that were not tested during this method. The claims weren't regarding the GM method itself, however regarding the particular sequence introduced into the crop. The methods of these studies are challenged. All reliable proof created to this point shows that presently obtainable is at least as safe to eat as non-GM food. An animal feeding trial of GM tomatoes changed to supply high levels of antioxidants showed the GM tomatoes lessen the levels of cancer. This is not because tomatoes are genetically modified, but rather because they produce antioxidants that are known to reduce the incidence of cancer. The U.S. FDA, U.S. EPA, and USDA make sure that GMOs are safe for human, plant and animal health.





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## BURDEN OF CANCER

IN INDIA: TREND ANALYSIS FROM 2000-2021  
20200901034

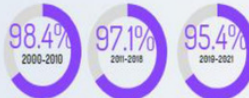
### INTRODUCTION

- 1) IN 2015 Cancer caused over 8.7 million death globally and the second leading cause of death behind cardiovascular disease.
- 2) Despite substantial progress with regard to prevention and treatment for cancer.
- 3) Accurate allocation of resource for prevention and control of cancer requires knowledge of local burden of cancer.

My Chart



ANYLISIS OF 2000-2015



### MATERIALS AND METHODS

The calculation of burden of disease in term of disability adjusted life years doing using the methodology used in LED bulb order indices a study dialysis is an indicator that combines the morality and the morbidity components of the diseases mortality data was provided by the department of statistics India and data on incidence of Cancer awareness and National Cancer registry WHO standard population of 2000 to 2021 was used for age standard.

### OBJECTIVE

THE STUDY WAS CONDUCTED TO LOOK AT TRENDS IN BURDEN OF CANCER.



### DISABILITY ADJUSTED LIFE YEARS

The overall burden of disease is assessed using the disability-adjusted life year (DALY), a time-based measure that combines years of life lost due to premature mortality (YLLs) and years of life lost due to time lived in states of less than full health, or years of healthy life lost due to disability (YLDs).



$$DALY = YLL + YLD.$$

### DISCUSSION

we note the relative strengths and weaknesses of the various approaches to measuring the burden of cancer as well as the methodologic challenges that persist in burden-of-illness research. We conclude with a discussion of the research agenda to improve our understanding of the burden of cancer and of illness more generally.

### REFERENCES

- 1) Percent increase in mortality by GB cancer category after redistribution of different categories of garbage code (2008, only countries using ICD-10)
- 2) Flowchart of algorithm used to adjust MI ratios
- 3) Cancer ranking by total incidence based on global level for developing and developed regions and all countries, both sexes, 2013

BY:-

HANSRAJ RATHOD

20200901034

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BIOENGINEERING



## Stem Cell Therapy: Treatment for Cancer Cure

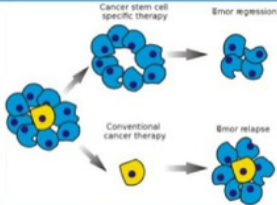


### Introduction

- (1). The use of stem cells to treat or prevent a disease or condition is known as stem-cell therapy.
- (2). Hematopoietic stem cell transplantation is the only established stem cell therapy as of 2016.
- (3). The cells are normally obtained from bone marrow transplantation, but they can also be obtained from umbilical cord blood.

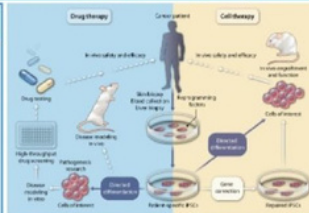
### What are Cancer Stem Cells?

- (1). Cancer stem cells are cancer cells that share characteristics with normal stem cells, such as the ability to produce all cell types present in a given cancer sample.
- (2). CSCs are therefore tumorigenic, possibly in contrast to other cancer cells that are not tumorigenic.
- (3). They live a lot longer than regular stem

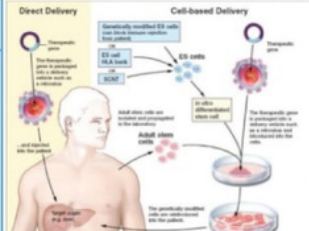


### Identification of Stem Cells

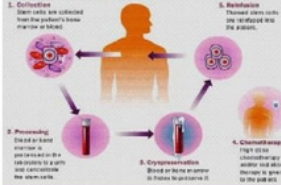
Cancer Stem Cells	Cancer Tumor Cells
Tumorigenicity	Large in Size
Sustained Proliferation	Disorganized Arrangement
Bentley	Loss of Normal Features



### Six stages of stem cell therapy



### The Autologous Transplant Process



### Stem Cell in Tissue Regeneration

- (1). With their exceptional characteristics of self-renewal capability and the ability to differentiate into almost all forms of cells in the body, stem cells play a key role in regenerative medicine.
- (2). Mesenchymal stem cells, embryonic stem cells, and induced pluripotent stem cells are all stem cells that can be used for tissue regeneration.
- (3). Due to poor viability and reduced regenerative activity of transplanted cells, stem cell transplantation alone into damaged tissues had a low therapeutic efficacy.

### Stem Cells as Delivery Vehicles

The majority of stem cells are injected intravenously or intramuscularly. Stem cell therapy may provide immediate pain relief for arthritis patients. Stem cell therapies are a straightforward procedure that does not require an overnight stay in the hospital.

### Stem Cell Mediated Gene Therapy

The process of isolating stem cells (hematopoietic and nonhematopoietic) from patients with genetic disease, genetically correcting the stem cells, possibly expanding them ex vivo, and transplanting them back into patients with the goal of producing genetically corrected cells in vivo.

### Conclusion

Advantages:-

- (1). Regulate Immune System.
- (2). Re-Establish cell to cell communication.
- (3). Re-Generate Normal Blood Flow

Disadvantages:-

- (1). Low Blood Cell Count.
- (2). Hair and Skin Problem.
- (3). Lungs And Kidney Problems.

Reference:- (1). Google  
 (2). [https://cancerli.biomedcentral.com/articles/10.1186/1475-2867-7-9#:~:text=Theoretically%2C%20identification%20of%20the%20cancer,proliferative%20capacity%20\(figure%203\).](https://cancerli.biomedcentral.com/articles/10.1186/1475-2867-7-9#:~:text=Theoretically%2C%20identification%20of%20the%20cancer,proliferative%20capacity%20(figure%203).)

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 20200901021  
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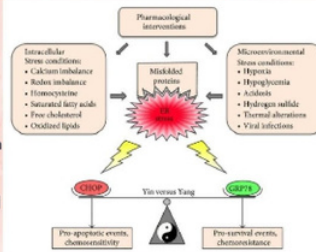
## ER STRESS : NOVEL PROSPECT FOR THERAPY

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### INTRODUCTION

- Endoplasmic reticulum is a multifunctional organelle.
- Number of physiological and pharmacological agents are able to disturb it's functions.
- Disturbances cause ER stress which severely impairs protein folding .
- Cell reacts to stress by initiating a defensive process called unfolded protein response (UPR).



Triggers of ER stress and the yin-yang balance of cell survival versus cell death. A great variety of conditions and pharmacological compounds can disturb ER homeostasis, leading to ER stress and the accumulation of unfolded and misfolded proteins. In response, ER stress signaling pathways stimulate pro-survival efforts to either neutralize the stressful insult or adapt to it.

### OBJECTIVE

- Stress response system is linked to several human diseases ( like cancer) and is therefore recognised as an emerging target for therapy.
- How we can target ER stress for therapy ?
- How we can achieve tumor cell death by chronic ER stress in cancer cell ?

#### Disease

#### Linkage to ER stress

- (i) Obesity induces ER stress
- (ii) Hypolipidemia and hyperglycemia induce ER stress

#### Type 2 diabetes

- (iii) Free fatty acids (palmitate) induce beta cell apoptosis
- (iv) Depletion of CREB impairs beta cell function and survival

#### Atherosclerosis

- (v) Oxidized lipids induce ER stress
- (vi) Hypofibrinolyticemia induces ER stress
- (vii) Cholesterol loading induces ER stress-induced cell death
- (viii) Reduced glucose

### METHOD

- ER ensures newly synthesized proteins in cell are properly folded.
- When number of protein exceeds ER's capacity to fold them ,ER stress can occur.
- UPR is triggered to help cell return back to normal.
- If UPR can't restore the balance the cell dies.

### RESULTS

- In cancer cells different conditions such as hypoxia and lack of glucose can lead to ER perturbation with an impact on protein folding in it, resulting in accumulation of unfolded protein causing ER stress.
- In response to the stress cells adapt a signalling pathway called UPR.
- Triggering cell death by ER stress via the UPR is one way to treat disease like cancer.

### CONCLUSION

- A detailed understanding of the consequences of pharmacological interference with ER stress response in patient is necessary in order to translate the respective approach into therapeutic opportunities.
- Research on the agents that relieve ER stress such as chemical chaperons and agents that target UPR signalling molecules are under investigation .
- This research represents a great step forward to understanding and eventually treating disease like cancer.

### REFERENCE

<https://www.hindawi.com/journals/scientifica/2012/857516/>

### ACKNOWLEDGEMENT

I would like to thank the author Axel H. Schonthal for his dedication and research efforts.

BY:-  
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## Agarose Gel Electrophoresis

### Introduction

Gel electrophoresis is the standard lab procedure for separating DNA by size for visualization and purification. Electrophoresis uses an electrical field to move the negatively charged DNA through an agarose gel matrix toward a positive electrode. Shorter DNA fragments migrate through the gel more quickly than longer ones. Thus, you can determine the approximate length of a DNA fragment by running it on an agarose gel alongside a DNA ladder.

### Procedure

#### Pouring a Standard 1% Agarose Gel:

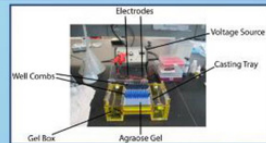
1. Measure 1 g of agarose.
2. Mix agarose powder with 100 mL 1xTAE in a microwavable flask.
3. Microwave for 1-3 min until the agarose is completely dissolved (but do not overboil the solution, as some of the buffer will evaporate and thus alter the final percentage of agarose in the gel.)
4. Let agarose solution cool down to about 50 °C (about when you can comfortably keep your hand on the flask), about 5 mins.
5. (Optional) Add ethidium bromide (EtBr) to a final concentration of approximately 0.2-0.5 µg/mL (usually about 2-3 µl of lab stock solution per 100 mL gel). EtBr binds to the DNA and allows you to visualize the DNA under ultraviolet (UV) light.
6. Pour the agarose into a gel tray with the well comb in place.
7. Gel at 4 °C for 10-15 mins OR let sit at room temperature for 20-30 mins, until it has completely solidified.

### Equipment used

- Casting tray
- Well combs
- Voltage source
- Gel box
- UV light source
- Microwave

### Reagents

- TAE
- Agarose
- Ethidium bromide (stock concentration of 10 mg/mL)

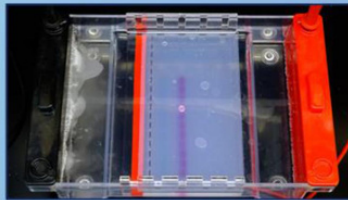
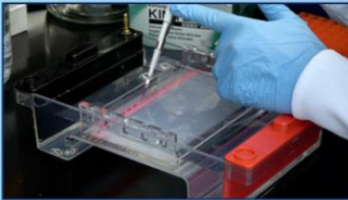


### Loading Samples and Running an Agarose Gel:

1. Add loading buffer to each of your DNA samples.
2. Once solidified, place the agarose gel into the gel box (electrophoresis unit).
3. Fill gel box with 1xTAE until the gel is covered.
4. Carefully load a molecular weight ladder into the first lane of the gel.
5. Carefully load your samples into the additional wells of the gel.
6. Run the gel at 80-150 V until the dye line is approximately 75-80% of the way down the gel. A typical run time is about 1-1.5 hours, depending on the gel concentration and voltage.

**Note: Black is negative, red is positive. The DNA is negatively charged and will run towards the positive electrode. Always Run to Red.**

7. Turn OFF power, disconnect the electrodes from the power source, and then carefully remove the gel from the gel box.
8. Using any device that has UV light, visualize your DNA fragments. The fragments of DNA are usually referred to as 'bands' due to their appearance on the gel.



### INFORMATION REFERENCE:

<https://www.addgene.org/protocols/gelectrophoresis/#:~:text=Gel%20electrophoresis%20is%20the%20standard,matrix%20toward%20a%20positive%20electrode.>

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20200901022

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BIOENGINEERING

# COMOPOLIS

What is it???



Just check it out !



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FORENSICS

FORENSICS

DID YOU KNOW THAT SOLVING A CRIME IS LIKE DOING A PUZZLE. FORENSICS PROVIDES THE MISSING PIECES

REALLY?



AND BIOTECHNOLOGY PUTTING BIOLOGICAL PRODUCTS AND PROCESSES TO HUMAN USE. IS A VALUABLE TOOL OF FORENSIC SCIENCE

OH NO!



BUT IT WON'T HELP SOLVING THIS PUZZLE! THERE'S A PIECE MISSING. I HATE IT WHEN THAT HAPPENS!!

WAIT, WHAT'S THIS ON THE FLOOR?



THERE YOU GO. THE MISSING PIECE.

THANKS.



AMRUTA ANGAD JADHAV

T.Y. BSc. BIOTECHNOLOGY

20190101036

# FORENSICS

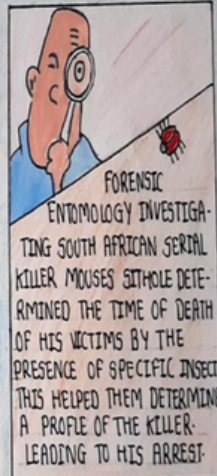
## FORENSIC ENTOMOLOGY

WHEN PEOPLE OR ANIMALS DIE THEIR DECAYING BODIES ATTRACT INSECTS.

FORENSIC ENTOMOLOGY COLLECT THESE INSECT.

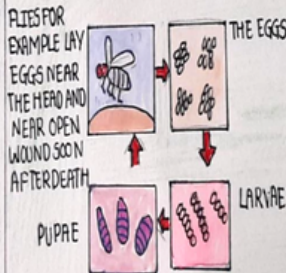
BY COMPARING THEM TO THE KNOW LIFECYCLES OF THE INSECTS THEY CAN LEARN ABOUT THE TIME AND CIRCUMSTANCES OF DEATH

ENTOMOLOGY IS THE STUDY OF INSECTS



FORENSIC ENTOMOLOGY INVESTIGATING SOUTH AFRICAN SERIAL KILLER MURDERER SITHOLE DETERMINED THE TIME OF DEATH OF HIS VICTIMS BY THE PRESENCE OF SPECIFIC INSECT THIS HELPED THEM DETERMINING A PROFILE OF THE KILLER LEADING TO HIS ARREST.

### LIFECYCLE OF FLY



DIFFERENT STAGES OF DECAY ATTRACT DIFFERENT INSECTS EVEN THE DRIED SKIN AND BONES ARE EATEN BY SPECIFIC BEETLES AND TICKS.

# FORENSICS

## BLOOD RELATIVES ?



CHILDREN OFTEN LOOK LIKE THEIR PARENTS BUT CAN WE BE SURE WHO THE TRUE PARENTS ARE?



COMPARING DNA CAN PROVE A PARENT-CHILD RELATIONSHIP, BECAUSE CHILDREN RECEIVE HALF THEIR DNA DIRECTLY FROM EACH PARENT.



1  
WHEN A SPERM CELL AND AN EGG CELL JOIN THEIR DNA MIXES IN THE NUCLEUS OF THE EGG CELL.



2  
BUT A SMALL AMOUNT OF DNA IS CARRIED IN A CELL ORGAN CALLED THE MITOCHONDRIA (THE ENERGY CENTRE OF THE CELL), AND DOES NOT MIX.

SO WHILE MOST OF OUR DNA IS A COMBINATION FROM BOTH PARENTS, SOME ONLY COME FROM OUR MOTHERS.



BECAUSE THIS DNA STAYS UNCHANGED FOR GENERATIONS, IT CAN BE USED TO TRACE WHERE CULTURAL WHERE COME FROM.

# FORENSICS

## DNA FINGERPRINTING

LIKE FINGERPRINTS DNA CAN LINK A SUSPECT TO A CRIME SCENE.

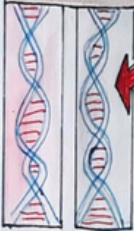


DNA IS A MOLECULE THAT DETERMINES HOW OUR BODIES ARE BUILT. IT IS FOUND IN ALL BODY TISSUES, AND EVERYONE (EXCEPT IDENTICAL TWINS) HAS UNIQUE DNA.

1 POLICE COLLECT TRACES OF BODY TISSUE FROM THE SCENE OF A CRIME; A SMEAR OF BLOOD, OR SKIN SCRAPPED OFF IN A STRUGGLE.



2 IN A LABORATORY, THE FORENSIC SCIENTIST EXTRACTS THE DNA FROM THESE CELLS AND COMPARES IT TO DNA TAKEN FROM A SUSPECT.



3 IDENTICAL DNA LINKS THE SUSPECT TO THE CRIME SCENE



A SUSPECT HAS BEEN CONVICTED BECAUSE OF DNA FOUND ON THE BACK OF A STAMP! SALIVA CONTAINS SMALL QUANTITIES OF CELLS FROM THE WALLS OF THE MOUTH. THESE WERE LEFT ON THE STAMP WHEN THE SUSPECT LIKED IT - POSITIVELY LINKING HIM TO THE CRIME.

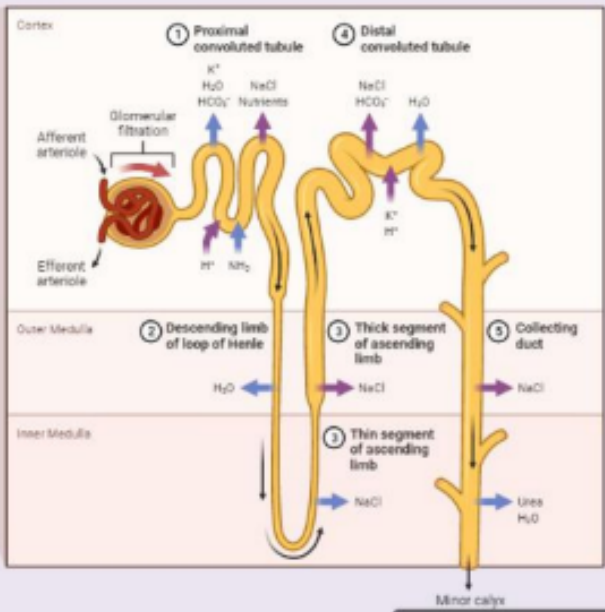


Urine formation



- Filtration** →
- H<sub>2</sub>O
  - Salts (NaCl, etc.)
  - HCO<sub>3</sub><sup>-</sup>
  - K<sup>+</sup>
  - Urea
  - Glucose
  - Amino acids
  - Some drugs

- Reabsorption and secretion**
- Active transport →
  - Passive transport →



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Steps of Urine formation :

1. The Glomerulus Filters Water and Other Substances from the Bloodstream.
2. Those components remain in the bloodstream. The filtrate (the fluid that has passed through the membrane) flows from the glomerular capsule further into the nephron.
3. As it moves, the needed substances and some water are reabsorbed through the tube wall into adjacent capillaries. This reabsorption of vital nutrients from the filtrate is the second step in urine creation.
4. The urine flows out of the nephron tubule into a collecting duct. It passes out of the kidney through the renal pelvis, into the ureter, and down to the bladder.

ABHISHEK PARMAR

S.Y. BTech.  
BIOENGINEERING

20200901033

DNA & GENES

# DNA

**WHAT IS BIOTECHNOLOGY?**  
BIOTECHNOLOGY IS ABOUT USING LIVING THINGS TO DO TASKS AND MAKE USEFUL PRODUCTS.

**BUT HOW DO LIVING THINGS ACTUALLY WORK?**  
LIVING THINGS ARE MADE OF CELLS.  
PROTEINS MADE IN THESE CELLS HELP THEM TO GROW AND SURVIVE.

**DIFFERENT CELLS DO DIFFERENT TASKS AND MAKE DIFFERENT PROTEINS AND THE INSTRUCTIONS TO MAKE EACH PROTEIN ARE FOUND IN DNA.**

**DNA?**  
THAT'S RIGHT - DNA - THE ONE MOLECULE THAT HOLDS THE GENETIC INSTRUCTIONS FOR LIFE, AND THAT PASSES CHARACTERISTICS FROM PARENTS TO THEIR CHILDREN.

**CELLS**  
THE BILLIONS OF CELLS IN MY BODY WERE ALL PRODUCED FROM A SINGLE CELL.

CHROMOSOMES ARE FOUND IN THE NUCLEUS OF THIS CELL. CONTAIN ALL THE INSTRUCTIONS TO GROW MY WHOLE BODY.

MITOCHONDRIA

NUCLEUS

CHROMOSOME

DIFFERENT PARTS OF THE INSTRUCTIONS ARE USED TO MAKE DIFFERENT PARTS OF THE BODY SUCH AS SKIN, BONE AND BLOOD.

RIBOSOMES

ENDOPLASMIC RETICULUM

BUT ALL THE CELLS CARRY COMPLETE SET OF THE INSTRUCTIONS.

NEHA RAMDAS THITE

T.Y. BSc. BIOTECHNOLOGY

20190101018

The diagram illustrates the flow of genetic information from DNA to protein. It starts with a cell containing a nucleus where DNA is packed into chromosomes. A chromosome is shown being unraveled into two DNA strands. One strand is used as a template to synthesize a messenger RNA (mRNA) copy. This mRNA then moves to a ribosome, where it is translated into a specific protein using amino acids. The diagram includes various text boxes explaining these processes and facts about DNA and genes.

**CELL**  
NUCLEUS

THERE ARE 46 CHROMOSOMES IN A HUMAN CELL CONTAINING ABOUT TWO METRES OF DNA.

SECTION OF DNA ARE CALLED GENES THEY ARE INSTRUCTIONS FOR MAKING SPECIFIC PROTEINS.

UNRAVEL A CHROMOSOME TO REVEAL THE TWO DNA STRANDS.

**GENES**

DNA STANDS FOR DEOXYRIBONUCLEIC ACID. ALL DNA IS MADE FROM JUST FOUR CHEMICAL BUILDING BLOCKS CALLED NUCLEOTIDES: ADENINE, THYMINE, GUANINE, CYTOSINE.

WHETHER WE ARE PLANTS, ANIMALS OR HUMANS OUR DNA IS BUILT FROM THESE FOUR NUCLEOTIDES. JUST IN A DIFFERENT ORDER.

WE INHERIT OUR GENETIC MATERIAL THROUGH DNA, FROM OUR PARENTS. HALF FROM OUR FATHER AND HALF FROM OUR MOTHER. THAT'S WHY WE OFTEN LOOK LIKE THEM. OUR GENES DETERMINE HOW OUR BODIES ARE MADE, FROM OUR EYESIGHT TO OUR HAIR COLOUR.

HUMANS ARE THOUGHT TO HAVE SOMEWHERE BETWEEN 30000 TO 70000 GENES!

ORIGINAL STRAND

TO MAKE A PROTEIN THE DNA SPLITS APART AND FREE NUCLEOTIDES JOIN TO MAKE A NEW COPY OF ONE STRAND.

NEW STRAND

AMINO ACIDS JOIN TOGETHER FOLLOWING THE TEMPLATE MADE FROM THE ORIGINAL DNA STRAND.

THIS COPY IS A MESSAGE THAT MOVES TO THE RIBOSOMES TO MAKE A SPECIFIC PROTEIN.

AMINO ACIDS JOIN TOGETHER FOLLOWING THE TEMPLATE MADE FROM THE ORIGINAL DNA STRAND.

AND A CHAIN OF AMINO ACIDS JOIN TO MAKE A PERSON.

CELL

NUCLEUS

CHROMOSOME

DNA

GENES

AMINO ACIDS

PROTEIN

CELL

NUCLEUS

CHROMOSOME

DNA

GENES

AMINO ACIDS

PROTEIN

CELL

NUCLEUS

CHROMOSOME

DNA

GENES

AMINO ACIDS

PROTEIN

CELL

NUCLEUS

CHROMOSOME

DNA

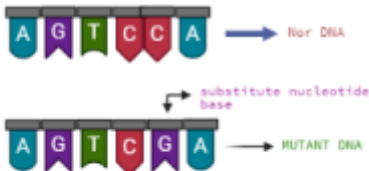
GENES

AMINO ACIDS

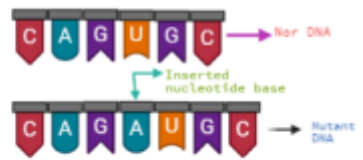
PROTEIN

## TYPES OF GENE MUTATION

### SUBSTITUTION MUTATION



### INSERTION



### DELETION



Created in BioRender.com

This shows different types of Gene mutation

1. Substitution Mutation – In this mutation, base pair is replaced with other base pair in the normal DNA as shown in the picture.
2. Insertion Mutation – In this mutation, new base pair is added into normal DNA as shown in the picture.
3. Deletion Mutation – In this mutation, one of the base pair is deleted from the normal DNA as shown in the picture.

Adenine and Guanine also known as Purine, while Thymine and Cytosine known as Pyrimidine.

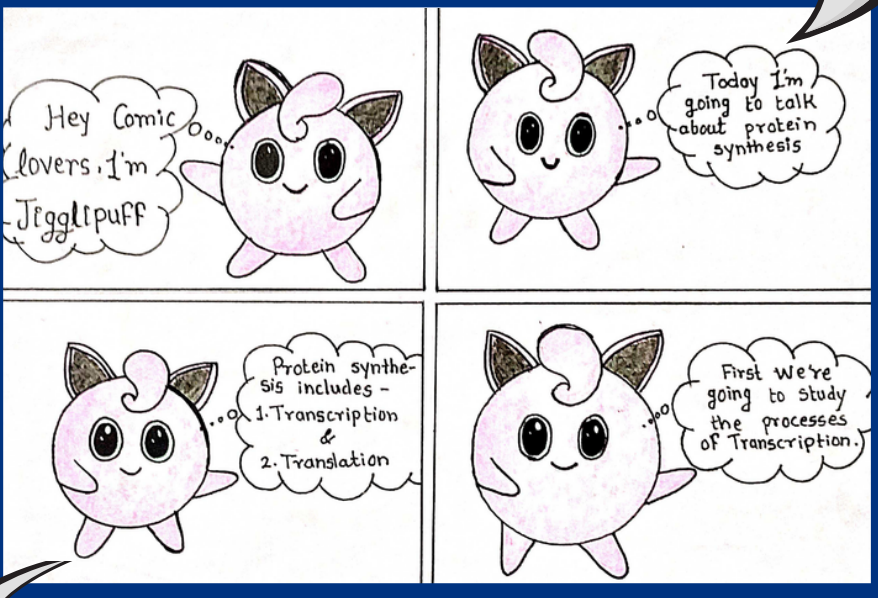
ANJALI PRITI

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20200901001



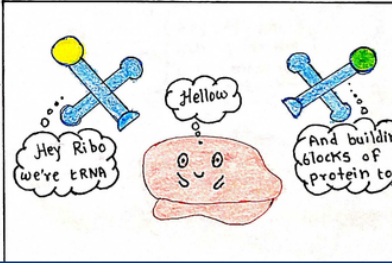
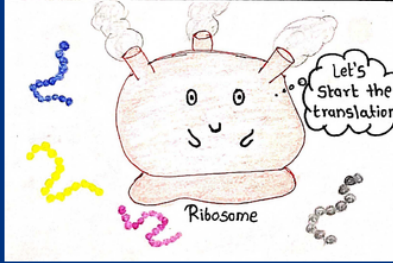
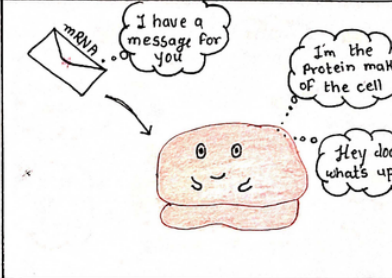
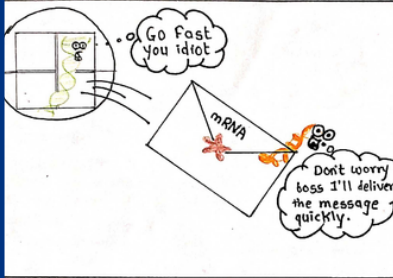
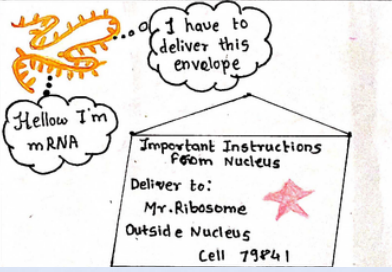
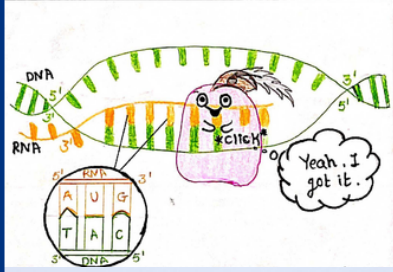
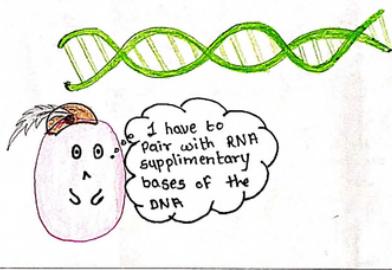
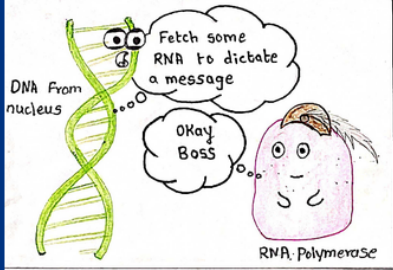
## PROTEIN SYNTHESIS

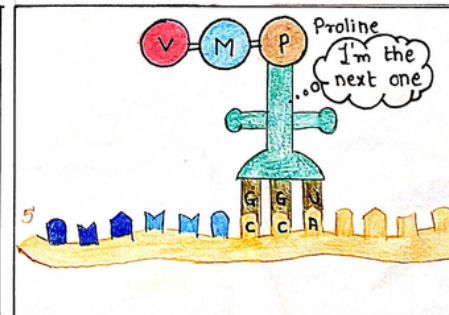
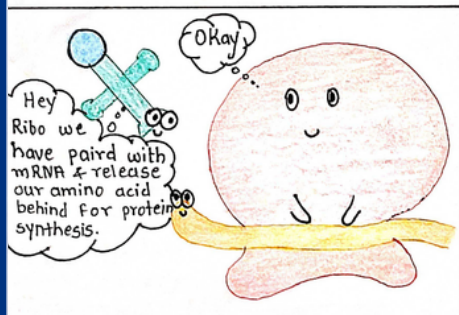
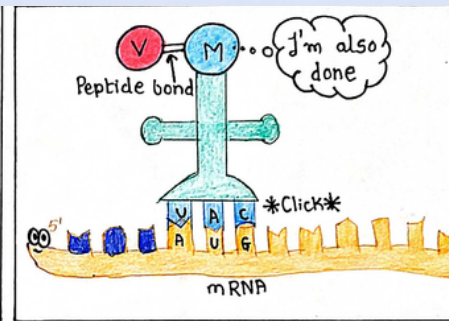
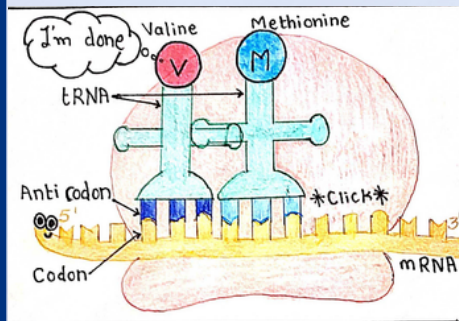
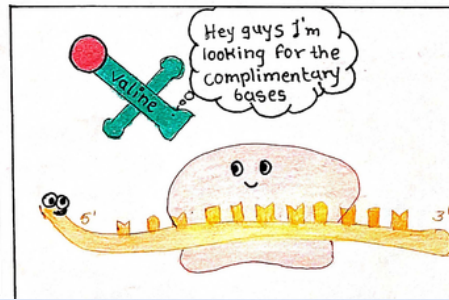
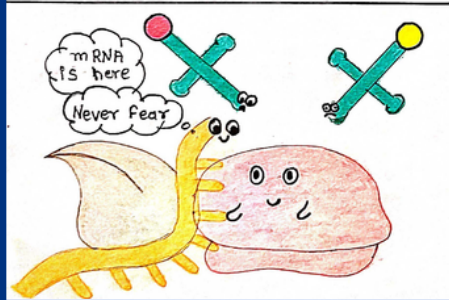
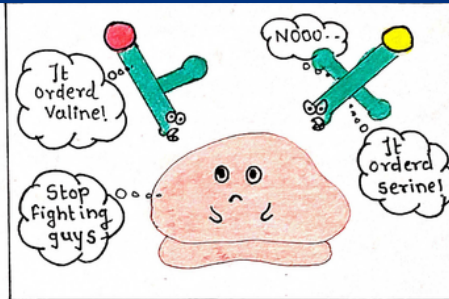
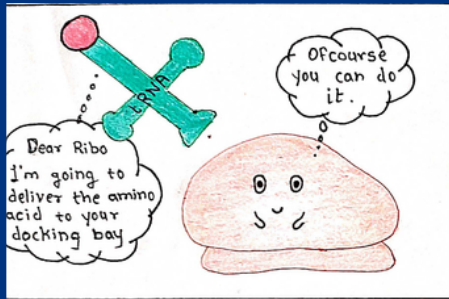


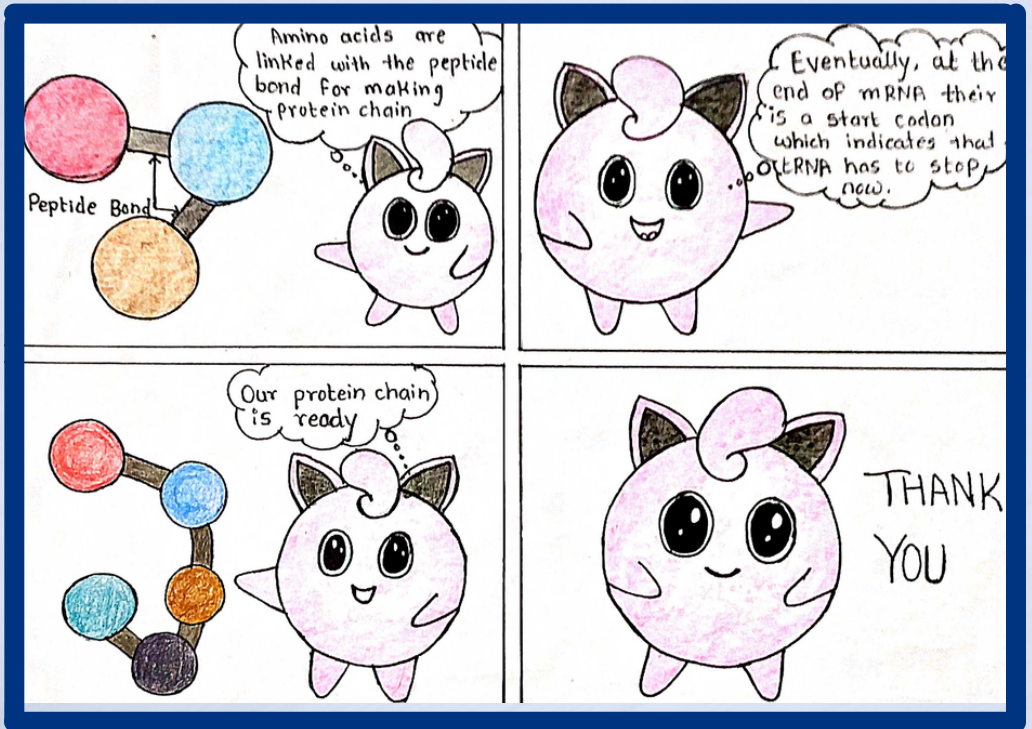
RIYA PRAVIN  
PATIL

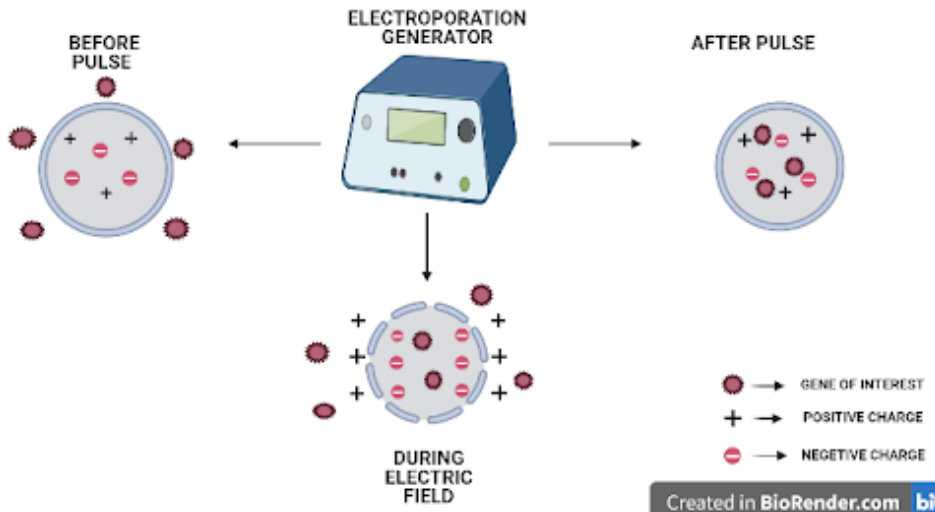
T.Y. BSc.  
BIOTECHNOLOGY

20190101002









Electroporators can be used to make the cell membrane permeable to DNA. Electroporation is a method of promoting competence. Cells are briefly shocked with an electric field of 8-20 kV/cm, which is in order to create holes in the cell membrane through which the plasmid DNA or the gene of interest may enter.

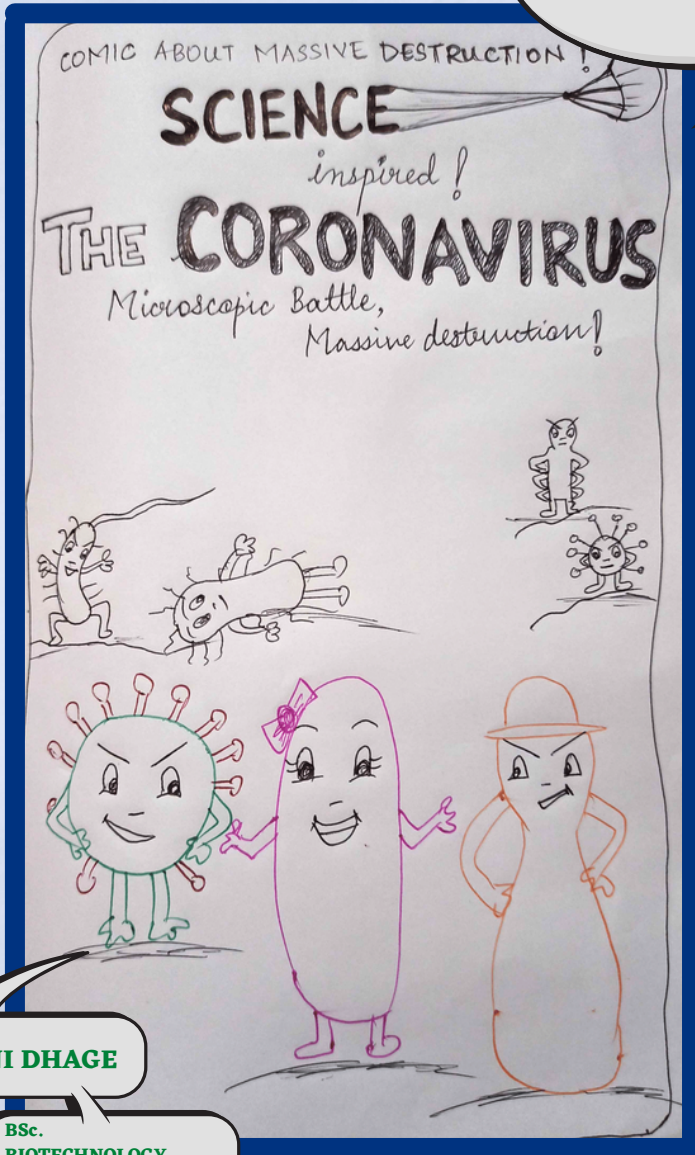
After the electric shock, the holes are rapidly closed by the cell membrane-repair mechanisms. The process of electroporation is often used to transform bacteria, yeast, or plant protoplasts by introducing new gene of interest or new plasmid.

YESHESWEENI V.  
BASKAR

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20200901022

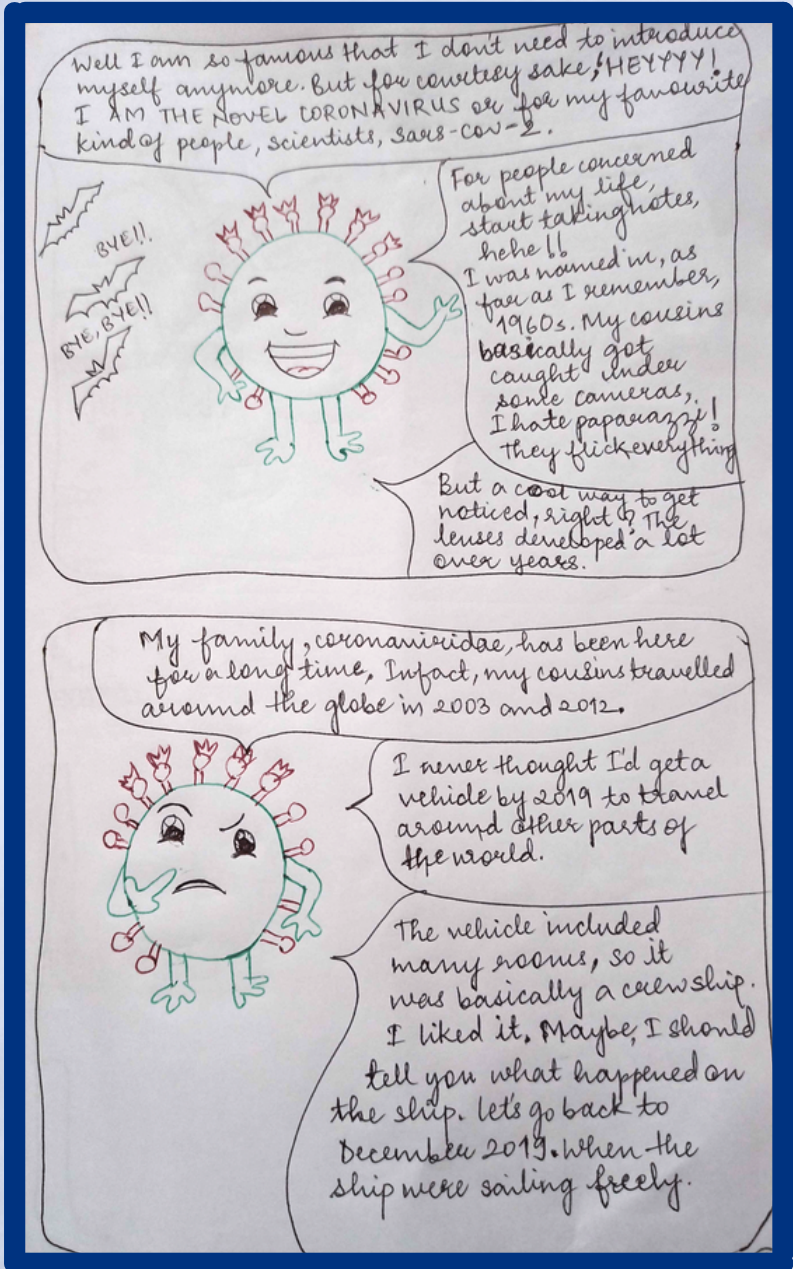
CORONAVIRUS

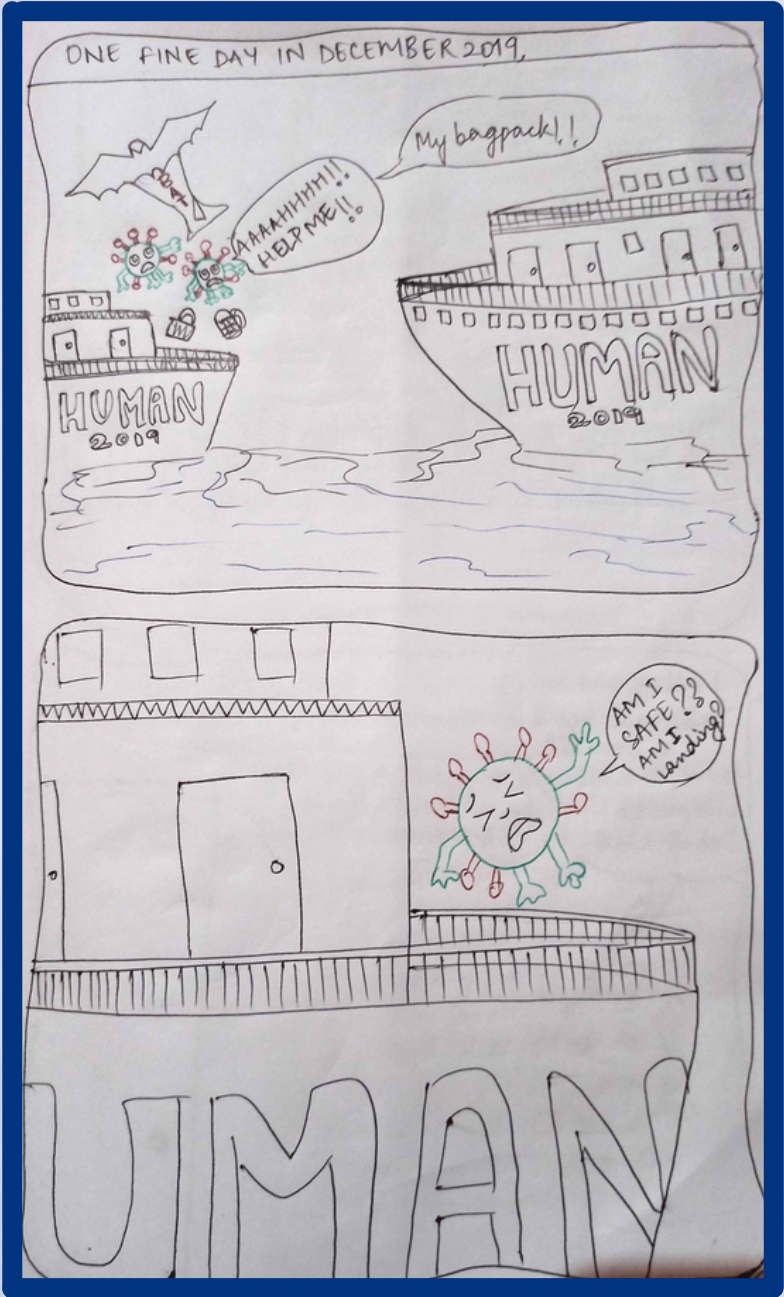


ROHINI DHAGE

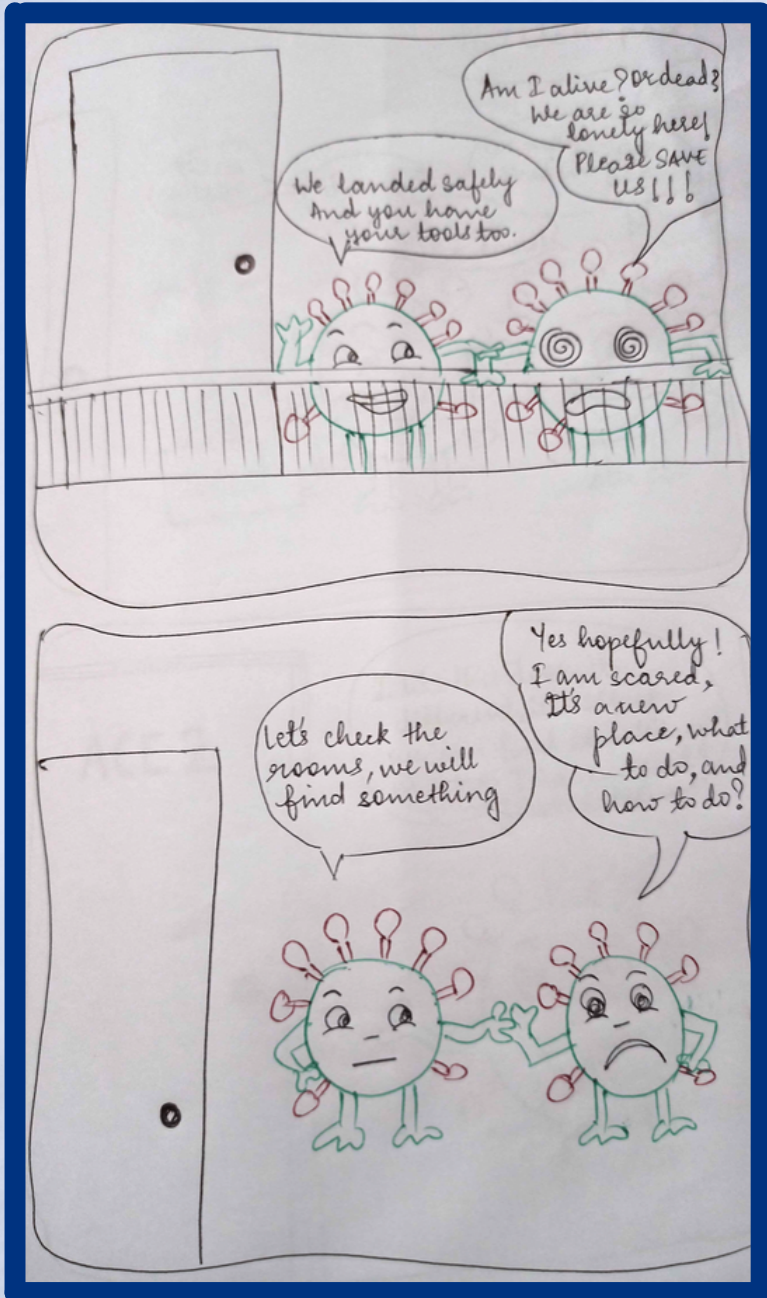
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BIOTECHNOLOGY  
ALUMNI (2018) BATCH

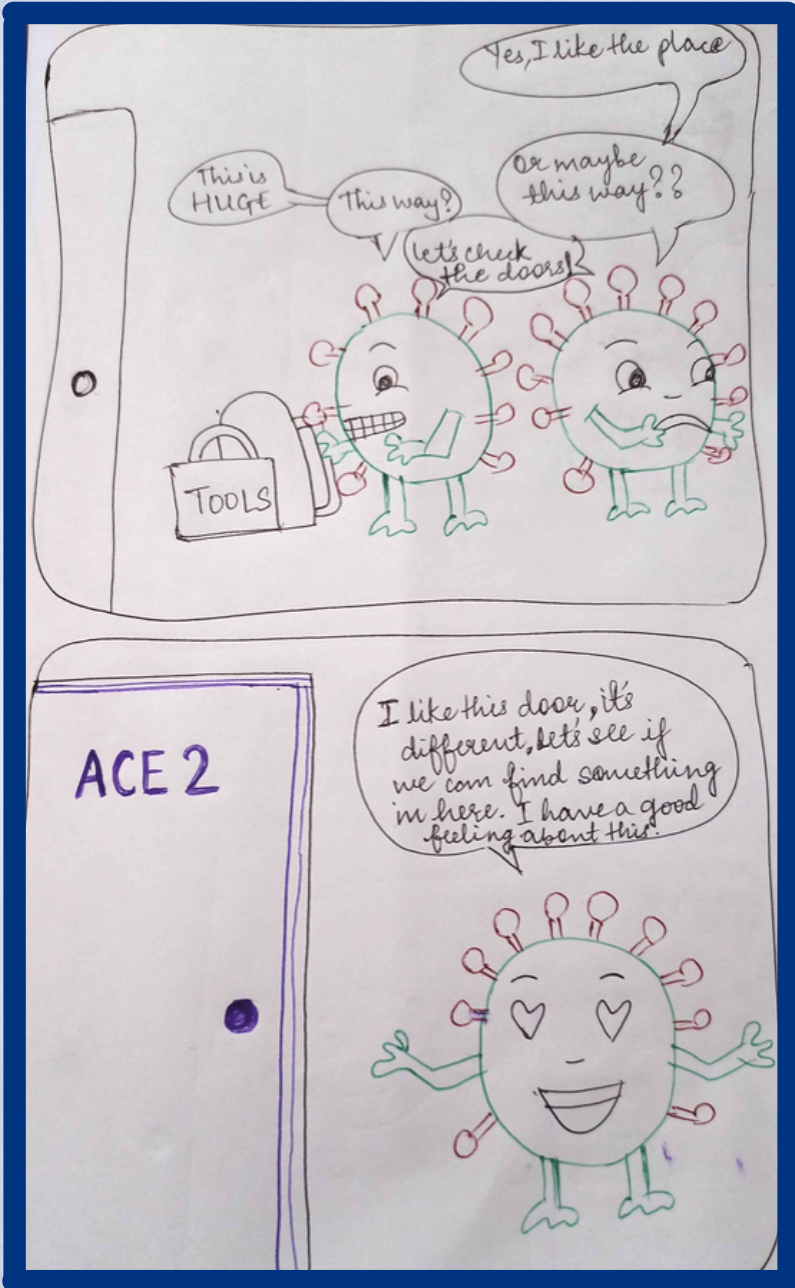
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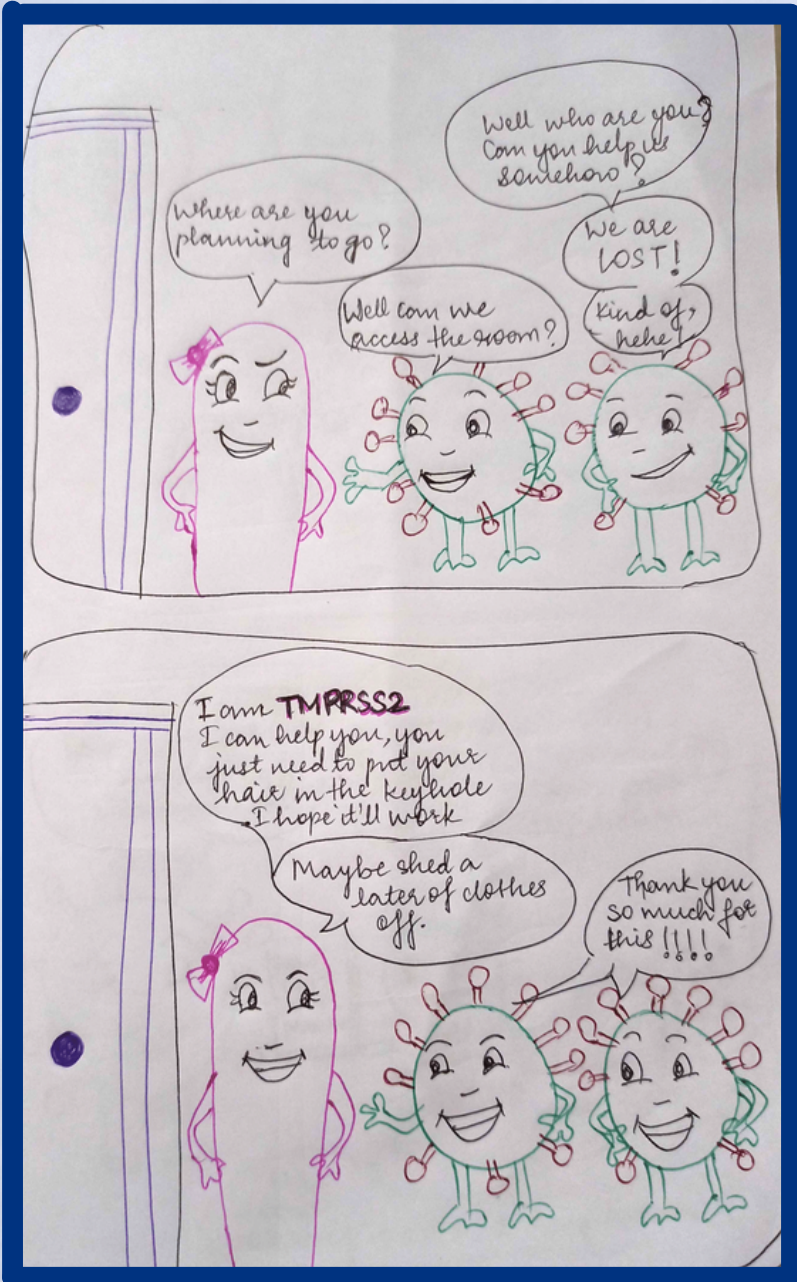


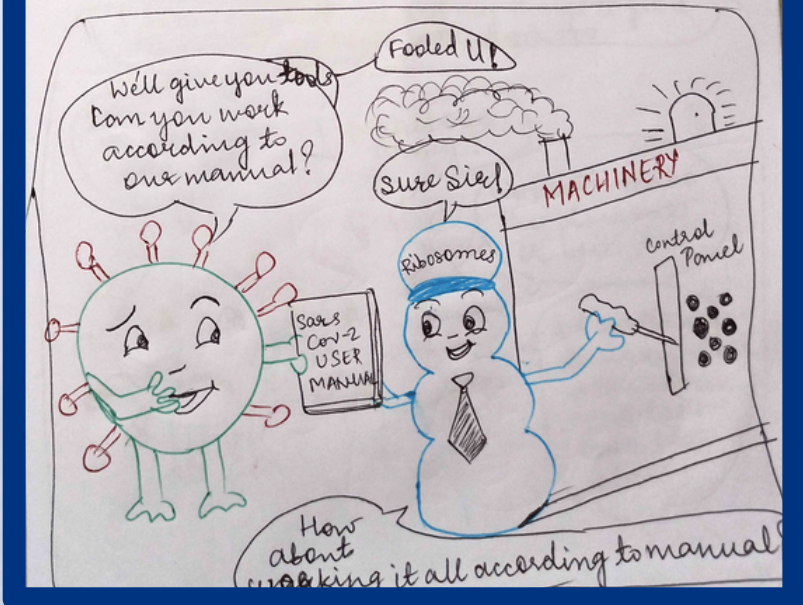
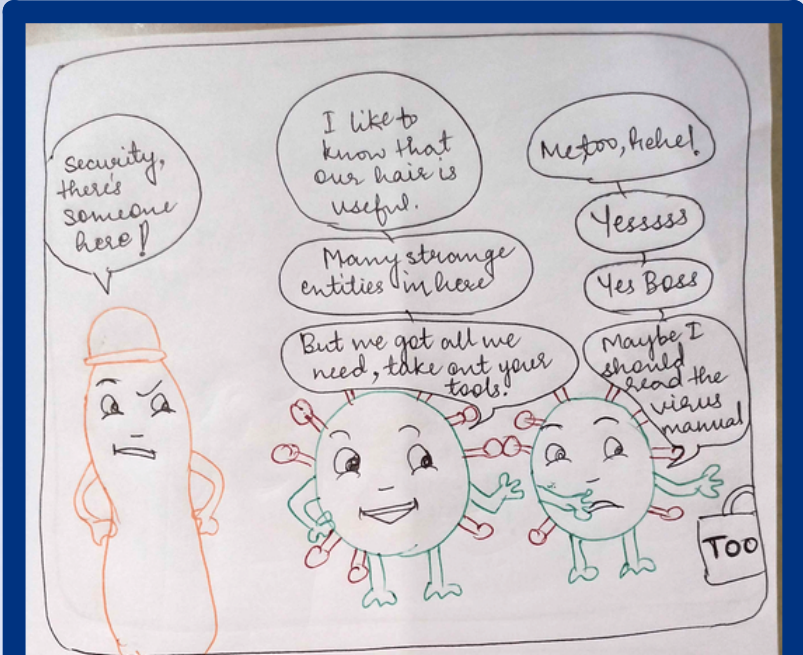


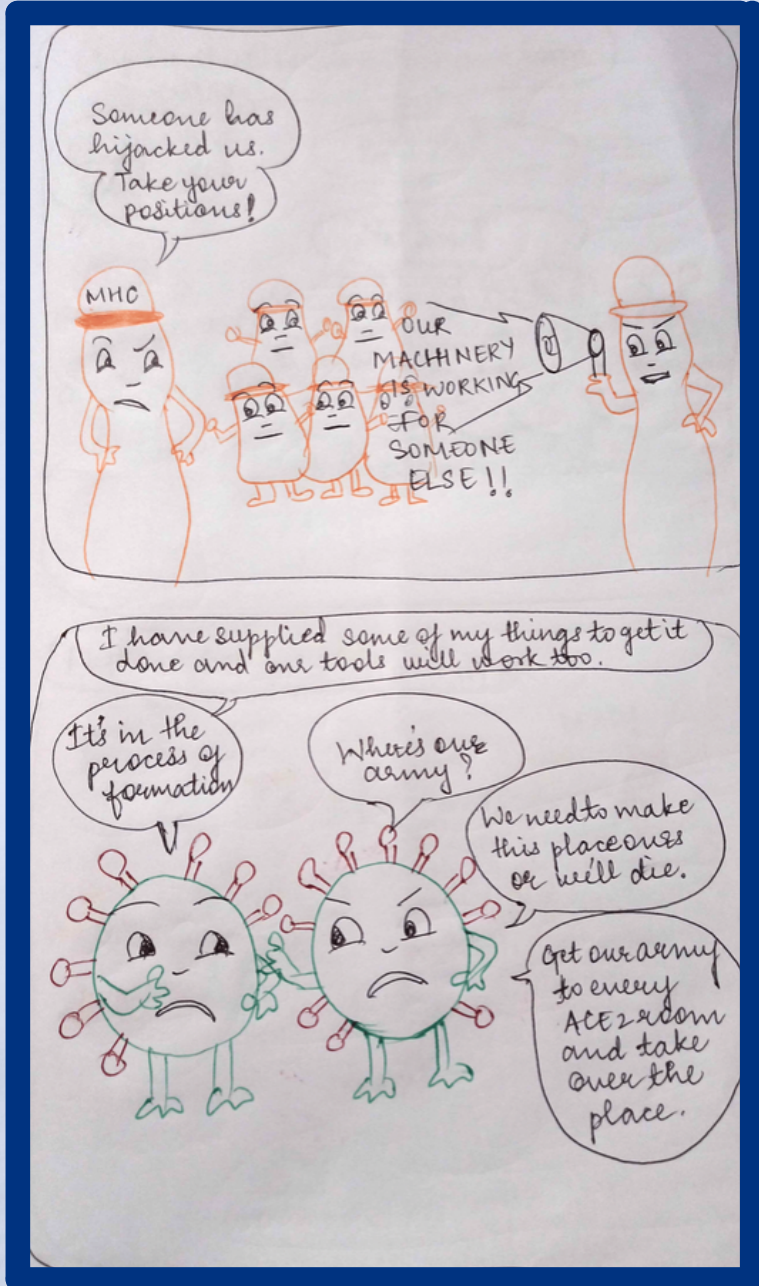


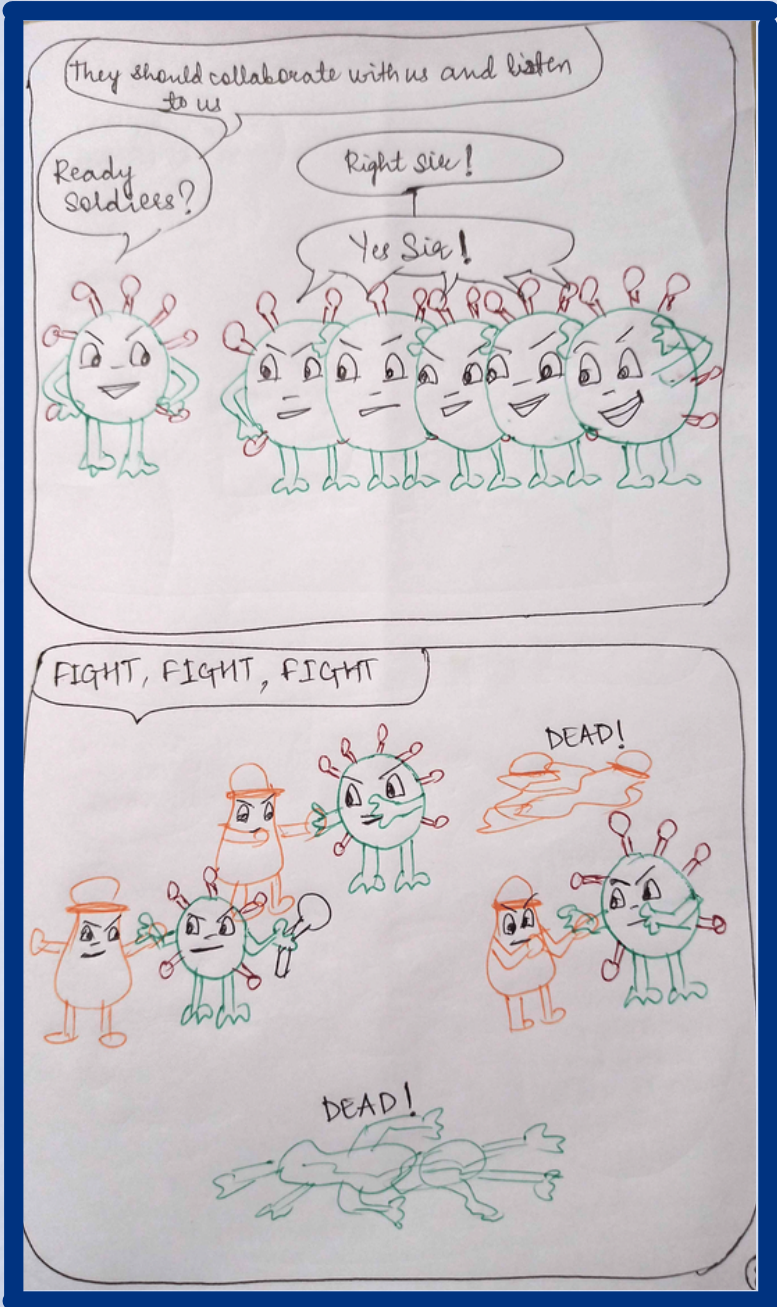


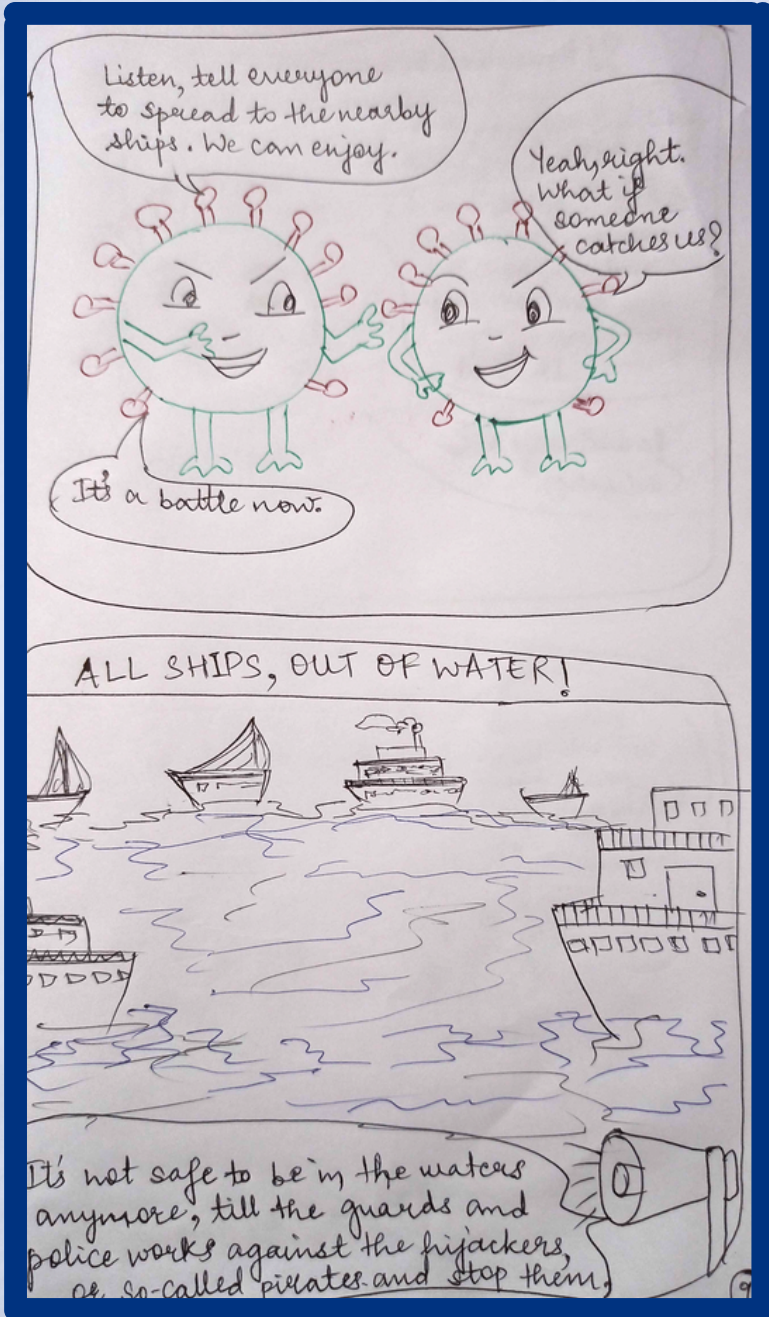












Well now you know what happened!?

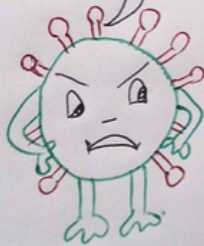


But yea, after fighting many obstacles now I am going to get a makeover (maybe I'll change a few features) and will update according to 2021.

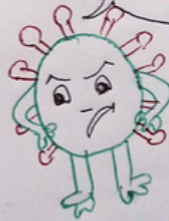
See you soon!  
(Maybe)

2025

I want to return to our normal life.

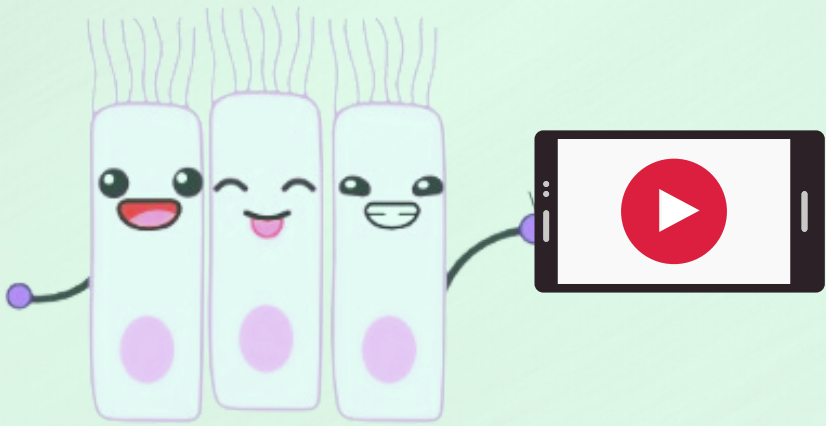


But sadly, there are no more ships left to <sup>be</sup> avoided.



(Might not be the end!)





# ANIFACNION

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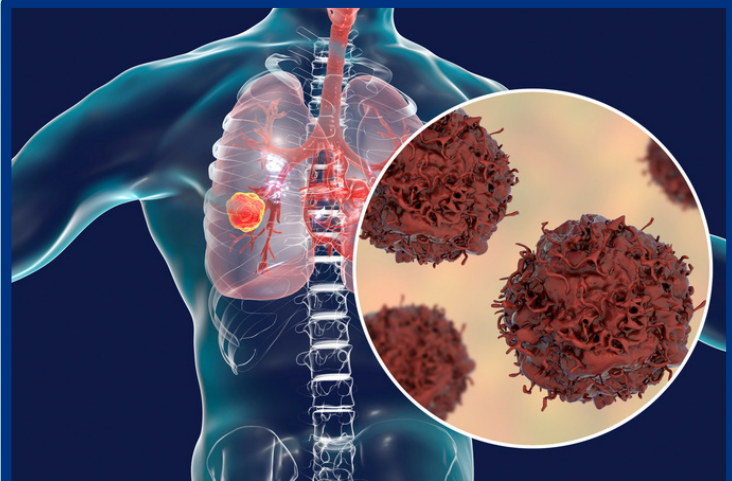
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SOLAR ENERGY

## LUNG CANCER



- Most common cancer worldwide.
- One of the most commonly occurring cancer in men and the third most commonly occurring cancer in women.
- 1 in 5 cancer deaths are from lung cancer.

BY-  
SRISHTI NAND  
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## DEVELOPMENT OF CORONA VIRUS VACCINE



<https://youtu.be/IRmdxz8dYDQ> 

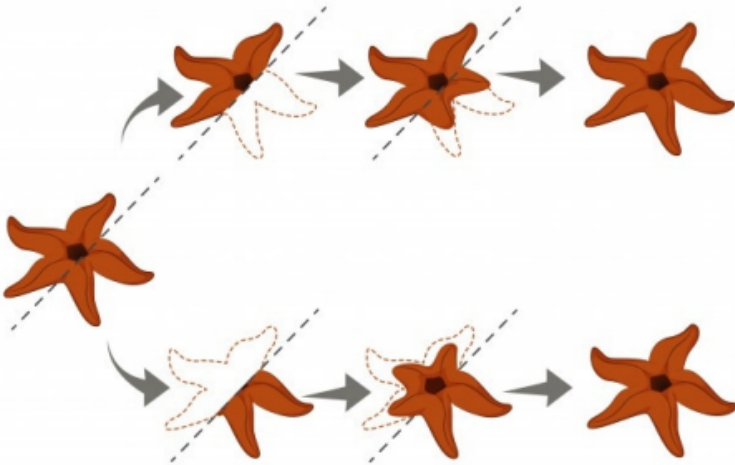
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Coronaviruses are large, roughly spherical particles with unique surface projections. They are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as MERS-CoV and SARS-CoV. Most people who fall sick with Covid-19 will experience mild to moderate symptoms and recover without special treatment. However, some will become seriously ill and require medical attention. There are several vaccines which are developed for Covid-19. Vaccines are Covishield, Covaxin, Pfizer, Sputnik and Moderna.

---

**BY-**  
**SONALI D. PANDEY**  
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## STARFISH




- Regeneration studied in Starfish/Sea star is because they have abundance of stem cells,
- The cells don't have a particular identity.
- They have no job until they are given a designated task
- It seems Starfish send the right signals, and their cells are able to differentiate properly, so they are able to regenerate whole new limbs or even sometimes whole bodies

BY-  
UTKARSH MISHRA  
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## STAGES OF MITOSIS AND CELL DIVISION



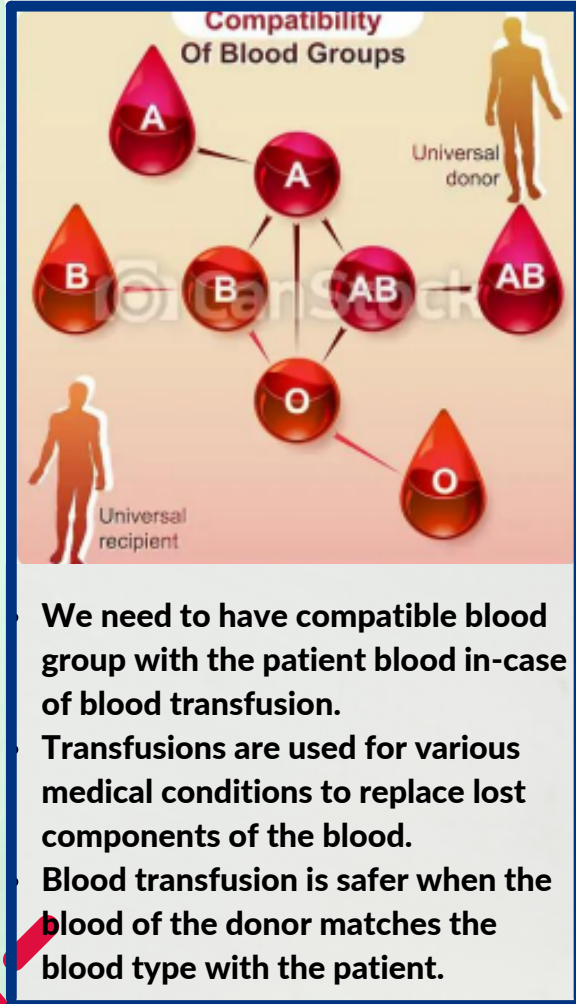
<https://youtu.be/-WxufXsRx5A> 

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The process of mitosis is divided into stages corresponding to the completion of one set of activities and the start of the next. These stages are prophase, prometaphase, metaphase, anaphase, and telophase. During mitosis, the chromosomes, which have already duplicated, condense and attach to spindle fibers that pull one copy of each chromosome to opposite sides of the cell. The result is two genetically identical daughter nuclei. The rest of the cell may then continue to divide by cytokinesis to produce two daughter cells. The different phases of mitosis can be visualized in real time, using live cell imaging.

---


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## NERVE IMPULSE CONDUCTION IN CELL BODIES



<https://youtu.be/4-HDeMv2qzg> 

---

A neuron transports its information by the help of an action potential. When the nerve impulse arrives at the synapse, it may cause the release of neurotransmitters which influence another (postsynaptic) neuron. The postsynaptic neuron may receive inputs from many additional neurons, both excitatory and inhibitory.

---

BY-  
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- The solar tree concept is the best innovation idea in solar cell technology.
- The solar tree is requires a very less space to produce efficiently.
- Solar tree leaves are producing energy for society.

BY-  
SHRUSHTI CHAVAN  
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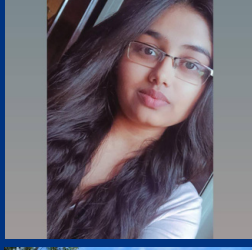
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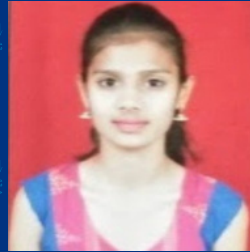
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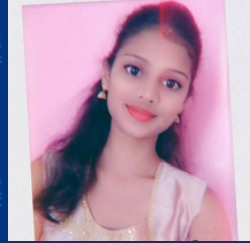
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PRN - 20180101022



Harshada Kondalkar  
PRN - 20180101021



Prutha Kitey  
PRN - 20180101020



Komal Khade  
PRN - 20180101019



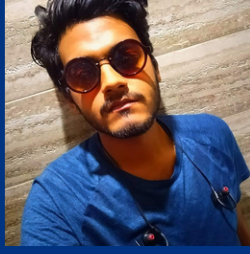
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**Prachi Mittal**  
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**Vidyun Mittal**  
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**Himgouri Mohite**  
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**Rutuja More**  
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# M e m b e r s



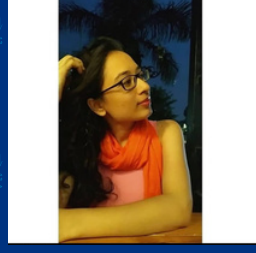
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**Shivani Patil**



**Monika Pillai**



**Shahabaz Pinjari**



**Gaurav Rajput**



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**PRN - 20180101032**

**PRN - 20180101033**

**PRN - 20180101034**

**PRN - 20180101035**

**PRN - 20180101036**



**Neha Shaikh**

PRN - 20180101042



**Pranali Sarkate**

PRN - 20180101041



**Sakshi Sankhe**

PRN - 20180101040



**Anuja Sandbhor**

PRN - 20180101039



**Vaishnavi Rokade**

PRN - 20180101038



**Nikhil Raka**

PRN - 20180101037



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**Apurwa Singh**

PRN - 20180101048

**Pranjal Shivekar**

PRN - 20180101047

**Kirti Shete**

PRN - 20180101046

**Arpita Shejole**

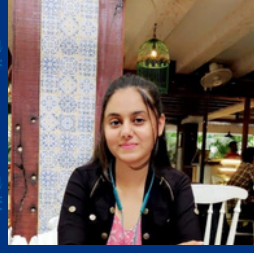
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**Sumayya Shaikh**

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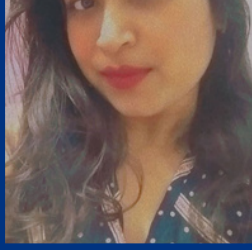
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**Shashank Tawar**  
PRN - 20180101053



**Sweta Kumari**  
PRN - 20180101052



**Kirti Singh**  
PRN - 20180101051



**Bhawna Singh**  
PRN - 20180101050



**Ayushi Singh**  
PRN - 20180101049



# M e m o r i x



**Pooja Kardile**  
PRN - 2018010059



**Zishan Ali**  
PRN - 20180101058



**Deepali Yadav**  
PRN - 20180101057



**Prathamesh Waghmode**  
PRN - 20180101056



**Vivek Varhadi**  
PRN - 20180101055





## **Message from Professor Shashi Singh**

**I share a sense of achievement with my fellow colleagues as our first batch of students graduate this year. I admire them for taking this courageous decision to join our newly founded organization and at the same time apologize to them for having to go through the rigmaroles of teething stages of the University. I would also like to wish them all the very best in the future; you will be our founder alumni and you leave us strong. All the best**



## Message from Surabhi Ma'am

This one is to a bunch of fun loving, enthusiastic, young minds. I admire your courage to join a new university. I am sure you got to learn as much from us as we did from you.

Thanks for being a kind listener even when you were bored and thanks for being a generous critic when you knew something needed to be corrected. I am looking forward to interacting with you even after you would have travelled far, far away. Good luck!





## Message from Priyatosh Sir

As a faculty of D.Y. Patil International University, I am proud that such a bright batch of students has graduated under our supervision. I believe that wherever you all go, you will always make sure that you make your teachers and mentors proud. I wish to thank you for the uncommon zeal you have demonstrated towards your studies and research. But remember grades do not define your intelligence. You all are unique and have your own strengths, irrespective of the grades you get. All you have to do is recognize that potential and strive for the best. Do not compare yourself with others. It's your journey not theirs.

I am extremely fortunate that I got to be part of your journey of success which has just begun.

## Message from Ranu Ma'am

Learning by observation is the best practice. Imagination is more important than knowledge. Keep learning and develop an original way of thinking. The teacher's role is to guide in this process. We are mere packets of energies in the Universe. With this energy we try to channelize the energies in the students towards independent thinking and living to become responsible citizens in future. Enjoy the journey called Life.





## Message from Sanjay Sir

Wow! I (Dr. Sanjay Kumar) congratulate the team of Scinion and wish them great luck ahead for their endeavors. I believe this exercise will add a new dimension in your academic portfolio. I had little interaction with the graduating batch (2018) of BSc Biotechnology. However, I have the perception that they are going to rock in their future and will grab; whatever they deserve. Keep in touch with your Professors and colleagues. I wish great success ahead to all DYPIUians.

## Message from Meena Ma'am

Dear BSc-Biotech 2018 batch,  
Congratulations on successfully getting your graduation degree.  
You all worked hard to achieve your goals, And now you're on your way to seek new visions.  
Dream new dreams and embrace your life with passion and hard work.  
Keep up the good work!!  
Explore! Discover! Dream!  
All the best for your future endeavors





## Message from Sonal Ma'am

I feel amazed to write about our first graduating batch of School of Biosciences and Bioengineering. Each student in the batch was of unique quality. Some were very good in academics who continuously perform well. Some students were active in non-academic activities like Sports, Dance, singing Mimicry, Arts and craft, etc. So the batch was full of diverse qualities still work with unity. Being the foundation batch of the department and university they faced a lot of challenges in terms of resources. The pandemic situation stuck all of us at home. Despite all these challenges, some students stand well. As we know, challenges teach us a lot. Hope all the students take this as a challenging experience and move on to the next journey of their life. I congratulate all the graduating students and wish all the very best for their Bright Future.

## Message from Poonam Ma'am

The students were phenomenal. We were a family. They were dedicated, fun learning, polite and disciplined. Always eager for advice and recommendations. I appreciate that you all have a kind heart as well as are super talented. I wish you best of luck for your future and pray that all of you outshine in your life the way you did in the university. Be the same always. Best wishes and blessings to all.





Laboratory has reactions, We have connections!  
Experiments are our foe, Which never lets us go!  
We need to keep struggling, Until we are as happy with juggling!  
The fun time we have in the lectures,  
Becomes the laboratory nightmares,  
Bioinstruments ko banana chahte hai dost  
Par ek k baad ek hojaate hai woh ghost  
Kabhi hota hai chemicals k saamne girgiraana  
Aur kabhi hota hai khudko sulji pe chadana  
Alag alag ph States ko samajhna , Iodine ko hai sabse react karna  
Jaha aana hota hai result positive, Wahi bann jaati hai zindagi  
negative



Sochne ki shamata hoti hai jaha khatam, Wahi se shuru hota hai  
step pratham

Dimaag k saath haath ka hota nahi sync, Pata nahi kyu activities  
hote nahi link

Ghanton chale jaate hai, Time khatam ho jaata hai,  
Principle mein aise phaste hai, Ki bhul jaate hai procedure,  
Samajh hi nahi aata , Kaha se kare cure



Finally jab process hota hai complete, Hoga sahi yahi rehti hai  
umeed

Result ki hote hi meet, Hote hi humaari jeet

Aage hota hai group discussion, Ek bolta hai aur baaki sunte uska  
pravachan

Kar k saare kaam poore, Finally chhorti hai lab ko akele aur adhure  
Shareer toh humaare saath aage badh jaata hai

Dimaag wahi ka wahi reh jaata hai

Khushi k saath hota hai darr bhi

Aaj ka din toh Nikal gaya

Kal aana hai phir yahi

Lab se humaari dushmani nahi hai

Lekin dosti bhi aajtak huyi nahi hai!!!

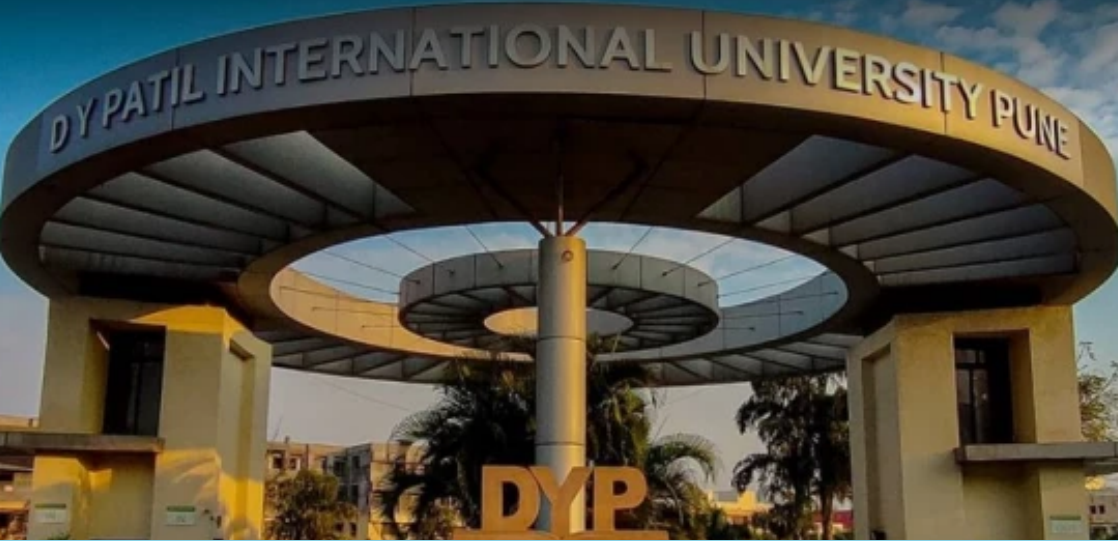






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2.0**

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