

The background of the cover features a complex, abstract representation of a microbiome. It consists of various biological structures in shades of blue and green. On the left, there are elongated, branching structures resembling fungal hyphae or bacterial filaments. In the center and right, there are more complex, multi-lobed structures with numerous small, rounded protrusions, possibly representing different types of microorganisms or their interactions. The overall effect is a dense, interconnected network of life forms.

Volume - IV

MICROBIOME-18

A NEWSLETTER BY THE DEPARTMENT OF MICROBIOLOGY
Vijaya College, R.V.Road, Bengaluru

BEWARE! IT'S HERPES

You might have heard about Herpes. Thank God if it's just in your thoughts, because once it likes you, no matter how hard you try, it won't leave you.

LET'S GO THROUGH IT'S HISTORY!!!

Herpes in Greek means 'to creep' or 'to crawl' which shows the nature of spreading. Herpes infected humans even before we evolved. It is one of the oldest sexually transmitted infection.

FAMILY OF HERPES – OOPS! EVEN THEY HAVE FAMILY!!!

HERPES SIMPLEX

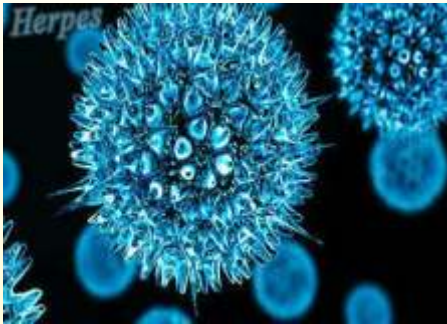
Is a viral disease caused by Herpes Simplex Virus (HSV).
HSV – 1 strain causes Oral herpes (on mouth).
HSV – 2 strain causes Genital herpes (genital or sex organs).
Symptoms - Blisters which break open , Small ulcers

HERPES ZOSTER [SHINGLES]

- Is a viral disease caused by Varicella zoster virus, chickenpox being the initial infection.
- Once chickenpox is cured, the virus remains inactive in nerve cells, but becomes active during low immunity and moves from nerves to skin surface producing blisters.
- Symptoms – Blisters,headache,fever,burning pain, itching.

TRANSMISSION:-Highly contagious,mainly transmitted from direct contact through kissing,sharing utensils,lipbalms and sexual contact.

Mother can also transmit both the types of infections to child during birth.



MEDICINE: -Antivirals such as Valacyclovir and Acyclovir.

DURATION: -About 20 days.

PREVENTION: -Even protected sex is not 100% efficient in preventing the infection,vaccination.

WHAT MAKES HERPES MORE DANGEROUS?

Cold sores on lips may seem mild but it may cause severe health complication.

It may cause infection in eyes causing blindness and brain causing inflammation of the brain(encephalitis).

2 out of 10 people are actually unaware of their infection because they will be unaware of classic symptoms.

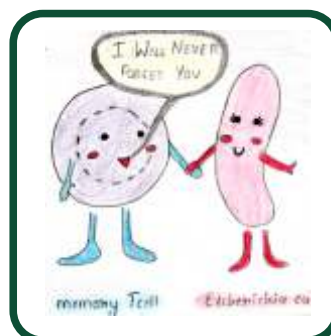
70% of people get virus from one who don't have an active infection.

**N.Akshaya Simha
Shakthi Vignesh.S**

CICD: A Breakthrough In The Field of Cancer Research

- Cancer is the name given to a collection of related diseases in which some of the body's cells start dividing uncontrollably and spreading into the neighbouring tissues. Cancer can occur in almost any part of the human body, which is made up of trillions of cells.
- Normally, healthy cells divide around 50-70 times before they undergo an inevitable process called apoptosis (Cell death). Cancer cells, however, become resistant to apoptosis, continue to divide endlessly and form a mass of cells called Tumour which leads to cancer.
- The major goal of cancer treatment is to eradicate all cancerous cells from the body. The four types of existing cancer treatments are: Surgery, Radiation therapy, Chemotherapy and Biological therapy. Most anti-cancer therapies work on curing cancer by compelling tumour cells to undergo the process of apoptosis. When a cell is compelled to commit suicide, proteins called caspases go into action.
- Caspases are enzymes (specialized proteins present in biological systems that breakdown other biomolecules) that digest the cellular components needed for survival and they spur the production of other enzymes called DNases that digest the DNA.
- The cell shrinks and sends out distress signals which are answered by macrophages. Macrophages are white blood cells that function as vacuum cleaners of the biological system and clean away the remains of the cell that is undergoing apoptosis, thus giving no chance to the damaged cell to cause any further havoc.
- Recently, however, scientists have discovered a new process that can trigger the death of cancer cells and is more effective than existing methods. Prevailing cancer treatments fail to eradicate tumour cells from the body completely and hence the chance of recurrence is high.
- The new method- Caspase Independent Cell Death (CICD)-lead to the complete eradication of tumours in experimental models. University of Glasgow scientists plan to investigate the technique further.
- Apoptosis is a silent form of cell death, whereas when cells die through CICD they alert the immune system by releasing inflammation-causing proteins. The immune system can then attack the remaining cells that escaped the initial therapy-induced death.
- The researchers used lab-grown colorectal cancer cells (Also known as bowel cancer and colon cancer cells) to demonstrate the advantage of CICD. However, these benefits maybe applicable to a wide range of cancer types.
- Dr Justine Alford, Cancer Research UK's Senior Science Information Officer said: "This new research suggests there could be a better way to kill cancer cells which, as a bonus, also activates the immune system. Now scientists need to investigate the idea further and, if further studies confirm it is effective, develop ways to trigger this particular route of cell death in humans."

Harshitha S.S



Mohitha.S

NOBEL LAUREATES OF 2017



JEFFREY C.HALL

Jeffrey C. Hall, Michael Rosbash and Michael W. Young were awarded the Nobel Prize in Physiology or Medicine in 2017 for their discovery about the molecular mechanisms controlling the body's circadian rhythm. The three scientists used fruit flies to isolate a gene that controls the rhythm of a living organism's daily life. Dr. Hall, Dr. Rosbash and Dr. Young were "able to peek inside our biological clock," helping "explain how plants, animals and humans adapt their biological rhythm so that it is synchronized with the Earth's revolutions," the Nobel Prize committee said.

All organisms, including humans, operate on 24-hour rhythms that control not only sleep and wakefulness but also physiology generally, including blood pressure and heart rate, alertness, body temperature and reaction time.

In 1984, the scientists isolated the period gene (*per*) from *Drosophila* fruit fly and discovered that cells use it to make a protein that builds up at night, during sleep. In daytime, the protein degrades in accordance with the insects' sleep-wake cycle.



MICHAEL ROSBASH



YOUNG

The researchers believed that this protein, PER (period circadian protein), blocked the period gene during the day. As PER was broken down in daytime, the gene regained its function and worked again during night, directing the synthesis of PER.

Over the years, the scientists discover other components that allows light to influence the 24- hour rhythm. Their work was pivotal, the Nobel committee said, because the misalignment between a person's lifestyle and the rhythm dictated by an inner timekeeper — jet lag after a long flight, for example — could affect well-being and over time could contribute to the risks for various diseases.

Chaitra T.D

ARSENIC LIFE DISCOVERY

An organism that appeared to have rewritten the laws of life has been brought down to earth by new studies at arsenic rich sediments of California's Mono Lake.

Dr. Felisa Wolfe Simon is a NASA Astrobiologist, Geomicrobiologist. She led a team that discovered GFAJ-1 an extremophile bacterium. This bacterium maintained its growth under arsenate concentration.

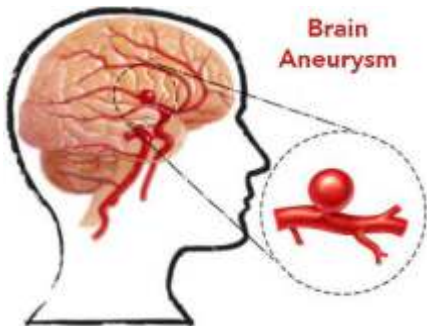
"The team concluded that GFAJ-1 must be incorporating arsenic into its DNA in place of phosphorous," as arsenic and phosphorous being chemically similar. These bacteria thrived in arsenic rich, poor phosphorous lab conditions (grown on media).

These findings were exciting to exobiologists, as they speculated that extraterrestrial life might survive in extreme, unexpected places. However these findings were criticized as the other researchers could not replicate Wolfe-Simon's results, and biologist Rosendahl concludes that arsenic loving life forms does in fact require phosphorous to grow but shockingly tiny amounts of it.

Ananth Koushik.B

BRAIN ANEURYSM

“Pain is inevitable, Suffering is optional”



Nowadays, in Bengaluru it is very common to hear that people undergo a heart surgery and having a stent to heart. But, it is surprising to know that a flow diverter has been incorporated to brain to cure the aneurysm.

In Bengaluru, there was a patient who was suffering from brain aneurysm. The clinical condition was the two veins out of the four veins which supply blood to the brain were completely blocked. Therefore, high pressure was seen on the remaining two veins and those two veins got bulged like balloons. The blood was getting collected only in that bulged part whereas the brain wasn't supplied with blood resulting in paralysis of the patient. It was diagnosed by MRI scan.

Brain aneurysm is a weakness in a blood vessel in the brain that balloons itself and fills with the blood. A cerebral aneurysm is a bulging weak area in the walls of an artery that supplies blood to the brain. Bulging is caused due to the dysfunction of the two veins out of four. A key symptom of a ruptured aneurysm is sudden, severe headache along with nausea, dizziness, light sensitivity, stiff neck, stroke or thunderclap headache. Unruptured aneurysm usually causes no symptoms.

After complete case study and discussion, doctor's panel decided to insert a flow diverter[stent] to the patient which avoids the blood to enter into the bulged part and allows the blood to flow in the vein region, thus avoiding paralysis or stroke. The doctors have operated this case by installing flow diverter to that part of the vein in the brain of the patient and they were successful in operating.

A small hole was made in the patient's thigh region and with the help of the veins in thigh region, flow diverter was allowed to flow till that bulged part of the vein in brain. The travel of the flow diverter was monitored by computer. A hair like vein was adopted with the flow diverter.

This successful work was done by Apollo Hospital doctors which is situated in Sheshadripuram of Bengaluru. The doctor's team was headed by Dr. G. G. Sharath Kumar and his assistant Dr. J. B. Agadi.

The statistics of brain aneurysm in India is more than 10 million cases per year. All in all, I would like to give a gratitude to the doctors and salute them for their commitment, innovation in the medical industry.

Siri G

BENEFICIAL AVOCADO

Avocado is consumed more due to its beneficial and medicinal uses in society. Avocado is also commonly known as “Butter Fruit”. Its basically grown as a wild fruit in Mexico, South and Central America.



The leaves contain essential oils and flavonoids. It has high calories 220kcal/100g. It contains oils based on Linoleic acid, Linolenic acid, Palmitic acid, Stearic acid, Vitamins like B1, B2, B3, B6, C, D and E. It also contains calcium, sodium, potassium, zinc, iron, copper, magnesium and managanese.

It has cholesterol lowering effect which seems a little paradoxical as it is so high in fat. Consuming plenty of Avocados in diet would prevent Atherosclerosis, Angina pectoris and Alzheimer's disease. The iron present in fruit is easily helps the people suffering from iron deficiency, anaemia and also menstruating and pregnant women can consume in diet. It cures ulcers and gastritis because of its alkaline properties and the pulp can be applied to skin as soothing remedy and protection for sunburn, suppurating wounds and skin irritations.

Mohitha.S

It's time to wear milk!!!!

Milk, you all know how much it's exploited for its fantastic properties. Now, it's time to make clothes out of it. Voila, milk lovers!! Milk is rich in fibrous protein Casein, which can be harvested from spoiled milk and spun to make clothes.

This property was discovered way back during I world war. They observed that when milk dries, it forms a hard film from which fibres can be obtained. These fibres were brittle and hard but lack durability needed for textile use. In early 1930s, an Italian chemist Antonio Feretti worked on casein fibers to overcome these drawbacks. His patent was bought by Italian Rayon from SniaViscosa who developed the large scale manufacture of casein fibers under the trade name Lanatil.



This technology being eco-friendly has benefited us by providing an opportunity to extract milk advantages from clothing. The amino acids in the fiber nourishes the skin and helps in keeping away allergies and wrinkles. It is light, soft, long lasting and can be dyed as our wish. It is very comfortable and provides excellent permeability for air and moisture. Having antibacterial effects, it is long lasting and resistant to bacteria and fungi. The natural humectant factors in casein helps to retain skin moisture and smoothens skin giving an effect of milk bath. It is ideal fabric material for those allergic to other fabrics.

Nidhish.P

Scramble

1. Causative agent of Whooping Cough

E D O B R T L E L A R E P U S T S I S

2. Creator of first Polio Vaccine

N A J O S K S A L

3. Thermostable Enzyme used in Polymerase Chain Reaction

A Q T Y O P M R E A E L S

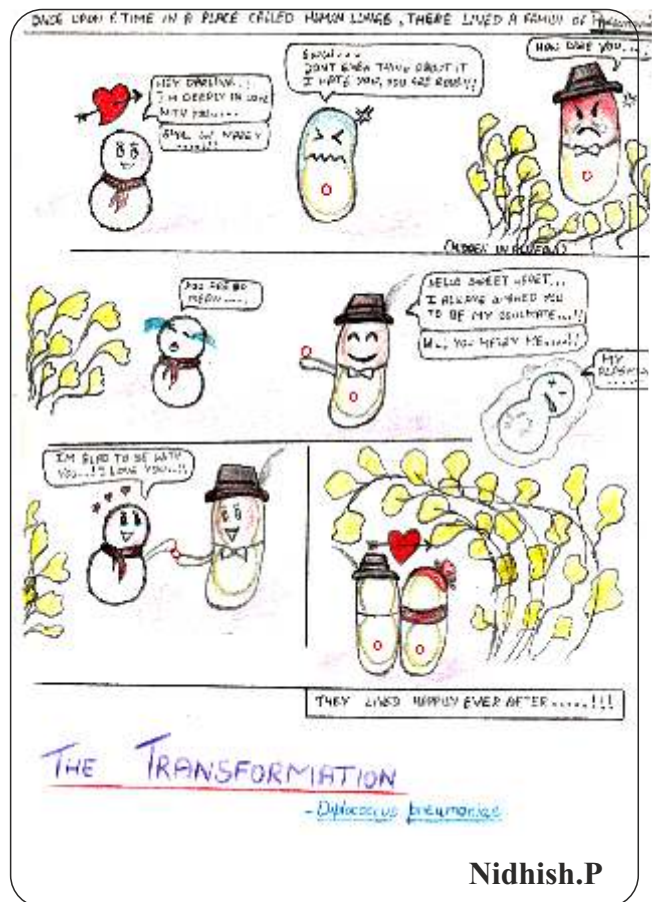
4. Organisms responsible for root nodule formation in Leguminous Plants

I R O H B Z M I U

5. Father of Medical Microbiology

E B R O R T O H C K

Harshitha. S. S.



Nidhish.P

DOWNWARDS
 1. INTRACELLULAR 2. CILIUM 9. ROBINWARREN 10. ASPERGILLUS 11. MOLD 12. SMARTS

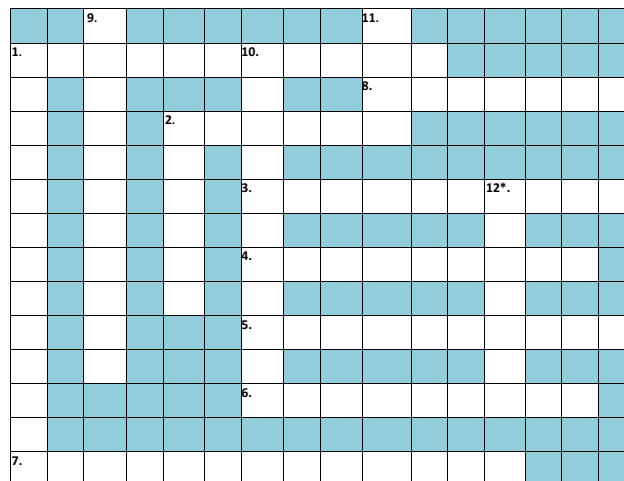
ACROSS
 1. INOCULATION 2. CAPSID 3. REPRESSION 4. INFECTION 5. LITHOTROPH 6. SYMBIOSIS 7. RHIZOBACTERIA 8. LECTINS

AMAZING FACTS ABOUT MICROBES

- .. The human mouth is home for more than 500 species of bacteria. Each square centimetre of our skin averages about 100,000 bacteria.
- .. A bacterium called *Ralstoniametallidurans* can turn dissolved gold into solid nuggets.
- .. Single drop of liquid can accommodate as many as 50 million bacteria.
- .. To prove that stomach ulcers were caused by bacteria and not stress, a scientist drank a beaker of bacterium. He indeed developed stomach ulcers and won Noble Prize in Medicine for proving it.
- .. The world's largest living organism is even bigger than a blue Whale. It is the humongous Fungus *Armillariaostoyae*, which covers 3.4 sq. miles in Malheur National Forest in Oregon.
- .. Streptococcus and Corynebacterium are the bacteria which metabolise sweat to produce body odour.
- .. Women hand harbour more lactic acid bacteria which help to ferment wine, pickle and yoghurt than men hands.

Aradhya .D

CROSSWORD



Tavisha.V.K
Chole Manasa

<u>ACROSS:</u>	<u>Downwards</u>
<ol style="list-style-type: none"> 1. To inoculate the inoculums. 2. Sid's cap is worn by a virus. 3. Feedback enzyme inhibition 4. Invasion of M.Os in tissues. 5. For survival of these microbes, inorganic substrates are obligatory. 6. A mutuality seen in two dissimilar organisms. 7. They love to colonize in roots. 8. Plant proteins with high affinity for specific sugar residues. 	<ol style="list-style-type: none"> 1. If you think inside the box, think inside the cell. 2. LOCOMOTION THROUGH HAIRS! Yes, we microbes do it with the help of _____ (singular) 9. Australian pathologist who won noble prize for rediscovery of <i>Helicobacter pylori</i>. 10. We are the proud producers of Aflatoxins. 11. My cottony appearance may deceive you. 12. *Population of cells aroused from a single pure isolate. Begin with the end. (Plural form)

Scramble Answer

1. *Bordetella pertussis* 2. Jonas Salk 3. Taq Polymerase 4. Rhizobium 5. Robert Koch

DEPARTMENTAL ACTIVITIES-2017-18

- **Niveditha.B.S.** scored 99.3% in Microbiology of 3rd Semester Bangalore University examination.
- **Aradhya.D** awarded Best Paper for Oral presentation of research paper on “Lignin Degrading Microbes-A Potential Source of Bioremediation” at national conference on “Recent trends in Sustainable Developments of Biodiversity and Management in Tumkur University, Zoology Department, on 12th January,2018
- **Harismitha.N** awarded Best Poster presentation in same conference on “Isolation and Identification of Lignolytic microorganisms”.
- **Shakthi Vignesh.S** awarded 2nd prize in poster in National Conference ”Applications of Microbiology in Human Welfare” in Tumkur University, Microbiology Department, on 30th January,2018 on “Role of Lignolytic Microbes in Bioremediation”.
- An **Educational tour** was arranged for final year students from 18th February to 25th February 2018. The places visited were University of Agriculture Science and Technology, CSIR-Institute of Minerals and Materials Technology, Institute of Life Science, National Institute of Science Education and Research, Central Institute of Freshwater Aquaculture
- A group of Final year students had participated in Workshop on **GIAN (Global Initiative on Academic Network)** approved by Ministry of Human Resource Development, Govt of India arranged workshop on “New Approaches in Tuberculosis and Drug Development” on 13-15 December, 2017 at **Indian Institute of Science**
- Workshop on Enzyme Studies and Applications organized by Jain University on 1st and 2nd February, 2018 which was attended by VI sem final year students
- **Department of Microbiology** has organized workshop on Current Technologies Involved in Microbiology in collaboration with **Aristogene**, Bangalore on 29th and 30th March, 2018.



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