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Vol. 9 (2022-23)

HANS RAJ MAHILA MAHA VIDYALAYA COLLEGE OF EXCELLENCE ओ३म् विद्या धर्मेण शोभते JALANDHAR

Celebrating the Centennial Decade 97 1927 - 2027 YEARS OF EXCELLENCE

SCIENCE GRAVITY

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डी ए वी गान

अविरल निर्मल सलिल सदय, ज्ञान प्रदायिनी ज्योतिर्मय,
हो चहुँदिश उद्घोष अभय ।। डी ए वी जय जय ।।
प्रबल प्रवाहमयी नित- नूतन जवन दायिनी सदा सनातन
वेद प्रणीता
परम पुनीता
यह धारा अक्षय
डी ए वी जय जय ।। दयानन्द से प्रेम-भक्ति ले हंसराज से त्याग - शक्ति ले
धर्म-भक्ति का
राष्ट्र-शक्ति का
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डी ए वी जय जय ।।

TABLE OF CONTENTS

Dear Students

It comes as an honour and a privilege to work at this temple of learning where everyone is a student and every day is an opportunity to grow and learn. We see ourselves as a community of learners, where everyone, including our faculty and parents learn along with the students. We firmly believe in preserving high standards with an unwavering dedication to work tirelessly to comprehend and enhance the educational process while completely focusing on student performance. HMV has always made an effort to instil in its students the right ideals in life as well as creativity, critical thinking, innovation, and diverse thinking. It runs a variety of programmes over the years to develop all these talents in the students.

This edition to the publication encourages creativity and helps the faculty members and students to express their ideas and ideals. It reveals a broad range of artistic abilities, including magazine editing in addition to writing and designing.

It goes without saying that the editorial board's tireless efforts, the students' active participation and all of those who worked behind the scenes to bring out the best in the young minds were all crucial in helping the creativity get manifested in this splendid form.

Prof. Dr. (Mrs.) Ajay Sareen

Principal

FROM THE DESK OF HEAD, FACULTY OF SCIENCES

Science is a way of life, teaching us how to think. It is a process of acquiring knowledge about the natural world. Mostly science is not glamorous because every scientist cannot become Marie Curie isolating radium. But people working in the field of science engage in work that can save lives, solve problems and move the human race forward. Young students are required to build lots of skills that they will need later in life such as clear communication, strong focus and good organization. Louis Pasteur said that "In the field of observation chance favours only the prepared mind". His statement is considered to be a postulate of scientific research. A scientist with a "Prepared Mind" has not only in-depth knowledge but the ability to make sharp observations about unexpected phenomena just by paying attention to details outside the research problem being studied. Our duty as a teachers is to raise appreciation of scientific issues in young minds so that they can contribute to ensure a longer and healthier life, provides medicines to cure diseases, reduces pain adding more fun to life by dint of their hard work in laboratories.

Dr. Neelam Sharma
Head, Faculty of Sciences &
Head, Chemistry Deptt.

FROM THE DESK OF DEAN ACADEMICS

Science and technology is indispensable in todays' world. The globe is exploring the universe, and new possibilities are emerging every day in this period where science and technology are developing at such a rapid rate that new innovations happen within a blink of an eye. Therefore, scientific and technological knowledge has become a prerequisite for sustained economic growth and improved quality of life. Scientific facts and logic are necessary to

comprehend the surroundings. After the facts are perceived, writing abilities are necessary to explain these phenomena to others. This magazine, called Science Gravity, released every year is a platform for students to elaborate their scientific knowledge, creativity and writing skills. It combines science and writing and elegantly displays the students' expression as well as scientific facts and processes for the benefit of readers. I appreciate the enthusiasm and scientific aptitude of our students. Keep exploring my dear students, and strive to maintain and conserve our environment by applying scientific knowledge imparted to you in HMV.

Dr. Seema Marwaha
Dean Academics &
Head, Zoology Dept.

FROM EDITOR'S DESK

It gives me immense pleasure to unleash 9th edition of this annual Science Magazine "SCIENCE GRAVITY". This e-magazine provides wings to our budding scientists and help in igniting spark in their minds. In Years 2021-22 humanity confronted with the biggest challenge of a century COVID-19. Science helped us to see the light at the end of the tunnel. We keep on moving forward to emerge victorious in this challenge by developing new vaccines like COVID-19 shots. Genomics, gene editing and synthetic biology are buzz words these days. Advancements in these fields help us to modify crops, cure and eradicate diseases, and other medical and biological breakthroughs. Year 2023 has been declared as 'The International Year of Millets" by the United Nations, at the behest of the Government of India, with the aim to create awareness and increase production & consumption of millets. Millets have been an integral part of our diet for centuries. In addition to a plethora of health benefits, millets are also good for the environment with low water & input requirement. As the global agrifood systems face challenges to feed an ever-growing global population, resilient cereals like millets provide an affordable and nutritious option, and efforts need to be scaled-up to promote their cultivation. "Millets can play an important role and contribute to our collective efforts to empower smallholder farmers, achieve sustainable development, eliminate hunger, adapt to climate change, promote biodiversity, and transform agrifood systems". India is often referred to as

the Diabetes Capital of the World as it accounts for 17% percent of the total number of diabetes patients in the world. There are currently close to 80 million people with diabetes in India and this number is expected to increase to 135 million by 2045. Millets are a powerhouse of nutrients and that research had shown millets as good defense in the fight against diabetes. Millets have a low glycemic index, which means such foods have lesser impact on blood glucose levels than foods that are higher up in the index. Millets use 70% less water than rice; grow in half the time of wheat; and need 40% less energy in processing. They are hardy crops that can withstand extreme heat conditions. Being a C4 group of cereals, millets convert more carbon dioxide to oxygen, contributing in mitigating climate change. Millets can endure extremely high temperatures to drought to salinity making it a climate resilient crop. Millets have higher efficiency in absorbing and utilizing carbon dioxide. Most varieties of millets are well known for their hardiness and have the capacity to withstand prolonged periods of drought, high temperatures and still produce grains and fodder. Looking at the benefits of Millets, I think we should bring awareness among people to use millets in their diets and support farmers to crop these miracle super foods.

Another thought which came in my mind and I would like to share with my readers is on watching beautiful and thought-provoking Oscar winning short documentary "The Elephant Whispers". It gives a beautiful message of conserving nature, sustainable use of natural resources and living in harmony with nature. This lesson is also given to us through nature during pandemic covid-19. So, it is our duty to act as responsible citizens in mitigating global challenge of climate change and conserving nature and its natural resources the herculean task of compiling the content and editing the magazine would not have been possible without our student editorial team. I extend my heartfelt thanks to all those visible and invisible hands responsible for making this magazine an exceptional one.

Wishing all the readers a memorable and happy reading time.

Dr. Shaveta Chauhan
Asstt. Professor, Botany Dept.

Knowledge is power. Knowledge shared is power multiplied!!!

I feel honoured to be the part of this effort. We need such platforms where a community can come together and share their knowledge and experiences. With great diligence, we put forward this years' Science Magazine which reflects the talent, vision, ambitions and achievements of our young minds. This magazine throws light on the tenacious efforts of our faculty and students in pursuit of scientific knowledge and to celebrate science.

My sincerest appreciation to all the authors, their passion and hard work to share their knowledge at this platform is highly commendable.

Dr. Vandna Thakur

Asstt. Professor, Chemistry Dept.

STUDENT EDITORIAL

Science encompasses the systematic study of the structure and behavior of the physical and natural world through observation and experiment, and technology is the application of scientific knowledge for practical purposes. Science and Technology Studies (STS) explore the human dimensions of science, technology and engineering. STS uses an interdisciplinary approach to investigate the interactions between science, technology and social practices Students learn to use humanities and social science methodologies to dedicate to using STS thinking in collaborating with science and engineering to produce professionals who will be the next generation and effective technological innovators. The rise of STS as a teaching field reflects a dawning recognition that specialization in today's research universities does not fully prepare future citizens to respond knowledgeably and reflectively to the most important challenges of the contemporary world. Increasingly, the dilemmas that confront people, whether in government, industry, politics or daily life, cut across the conventional lines of academic training and thought. STS seeks to overcome the divisions,

particularly between the two cultures of humanities and natural sciences. STS teaching seeks to promote cross-disciplinary integration, civic engagement, and critical thinking. Undergraduate STS courses are especially popular with engineering and pre-professional students, including premeds. They help to illuminate issues of professional responsibility and ethics. Such courses also build bridges between disciplines that do not ordinarily meet each other in the undergraduate curriculum, such as sociology and science, law and science, anthropology and technology, environmental science and political theory, or technology and philosophy.

Mandeep Kaur
M.Sc.-Botany, Sem-IV
Roll No-25058

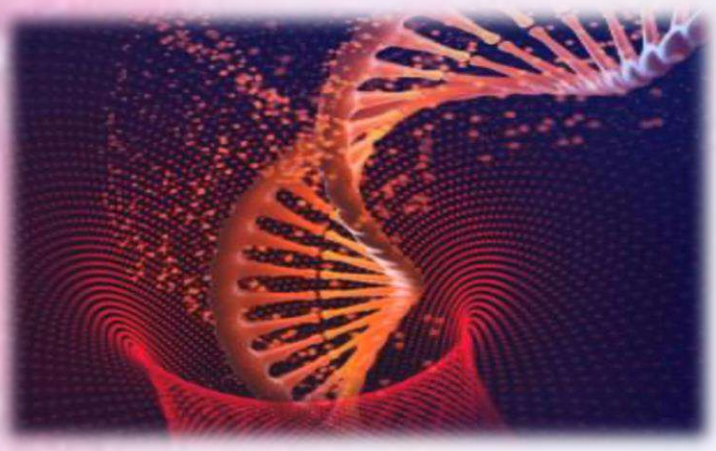
Science is a great aid to our modern life. The numerous gifts of science bless us from the early morning till the late night. We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science, their facts and technologies.

As we know science is a systematic and logical study into how the universe works. Science is an ever-changing subject. Science is also defined as the systematic observations, experiment and the measurements of the nature and behaviour of the material and physical universe. Have you ever wondered how we manage to stay cool in the face of air conditioning, fans, and coolers? Humans are naturally curious beings who are interested and curious about the reasons for events. However. How to study the qualities of a certain species or objects was a major concern for all humans. There are scientists who have grouped the study of several subjects under the board discipline of SCIENCE. Our mankind has benefited immensely from science. Man, as a logical being, has been strange in his pursuit of environmental concerns, which has resulted in several discoveries in various parts of the globe. The study of the environment is known as science. Animals, chemicals, the force, the earth, plants and other subjects are studied in several fields of science such as physics, chemistry, and biology. So, as we know there are different examples and uses of science in our daily lives. As like, we use cars, bikes or bicycles to go

from one place to another these are all inventions of science. In agriculture, science has made it's mark by contributing so much. In present day, machines are available even for sowing the seeds on fields. All fertilizers are also given by chemical science. The medicine field is based entirely on the usage of science. Observing the magic and importance of science, we can say that it has a vast use in all fields of human life. It is of great importance to make our life easier. It gives an answer to all curiosities related to our lives. It gives wings to our imagination by its facts and theories. I am fascinated with science because I think that the developments till now have been so remarkable but yet there is a lot to be discovered and we are only at the tip of the iceberg. Our science students contributed their powerful knowledge through various article in this magazine. I personally believe yes, there is a clear fear of unknown, there's a lot of risk aversions in science and technology. They want predictability in everything and it starts from people. It starts from investors. There are a lot of incredible, exciting fun facts and challenges to use their brains for the benefit of humanity but through science and technology. Our magazine makes a sincere effort to aware the readers with modern and ongoing researches, inventions of researchers and scientists with number of facts and knowledge. I personally would like to extend my heartiest gratitude towards the whole editors' team, our teachers and all the young minds who gave their valuable times for magazine.

Annanya Verma
M.Sc.-Chemistry, Sem-II
Roll No.- 25360

How Artificial DNA can be used to Target and Kill Cancer cells?



"You can either be victim of cancer, or a survivor of cancer, it's a mindset".

Cancer is sadly familiar global health concern and current method of treatment has their limitations. However, drug based on nucleic acid namely DNA and RNA, the vital information carrying molecules can control the biological functions of cell, and are expected to transform the further medicine and provides significant boost to overcome of cancer. Nucleic acid drug used for cancer treatment has been challenging because it is difficult to make the nucleic acid distinguish between cancer cells and other healthy cells. This means there is a risk of adversely affecting the patient's immune system if healthy cells are inadvertently attacked. However, for the first time the team was able to develop a "hair pin shaped DNA strand" to target and can specific cancerous cells.

A research group at University of Tokyo led by assistant professor Kunihiko Morihiro and Professor Akimitsu Okamoto from the Graduate school of engineering were inspired to create a new anti-cancer drug using artificial DNA. This test was effective against over expressed miR-21 found in human cervical cancer – derived cells, breast cancer derived cells, and mouse malignant melanoma derived cells.

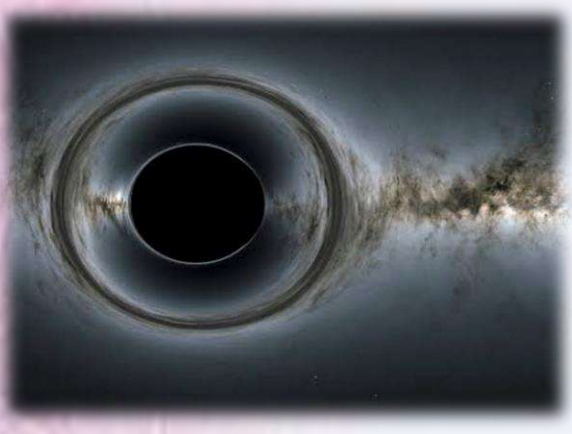
Cancer cells can over express, or make too many copies of, certain DNA and RNA mil, causing them to not function normally. The team created artificial oncolytic (cancer killing) hairpin DNA pairs called OHPs. These OHPs were triggered to form DNA strands when they encountered a short (micro) RNA called miR21, which is over expressed in some of the cancer. The artificial OHPs enter a cell and encounter the target micro-RNA, they open up to combine with it and form a longer strand. This then causes the immune system to recognize the presence of the over expressed miR-21 as dangerous and activate an innate immune response which ultimately leads to the death of cancer cell.

The formation of long DNA strand due to the interaction between short DNA OHPs and over express miR-21, found by this research group is the first example of its use as elective immune amplification response which can target tumour regression providing a new class of

nucleic acid drug, with a mechanism that is completely different from known nucleic acid drugs. The results of this study is a good news for doctors, drug discovery researchers and cancer patients, as we believe it will give them new options for drug development and medication policies.

Name – Isha Thakur
Class – BSc Biotechnology, Sem-VI
Roll. No– 23012

BLACK HOLE



A black hole is a place in space where gravity pulls so much that even light cannot get out. The gravity is so strong because matter has been squeezed into a tiny space. This can happen when a star is dying. Because no light can get out, people can't see black holes. They are invisible. Space telescopes with special tools can help find black holes. The special tools can see how stars that are very close to black holes act differently than other stars.

How Do Black Holes Form?

Scientists think the smallest black holes formed when the universe began. Stellar black holes are made when the center of a very big star falls in upon itself, or collapses. When this happens, it causes a supernova. A supernova is an exploding star that blasts part of the star into space. Scientists think super massive black holes were made at the same time as the galaxy they are in.

If Black Holes Are "Black," How Do Scientists Know They Are There?

A black hole cannot be seen because strong gravity pulls all of the light into the middle of the black hole. But scientists can see how the strong gravity affects the stars and gas around the black hole. Scientists can study stars to find out if they are flying around, or orbiting, a black hole. When a black hole and a star are close together, high-energy light is made. This kind of light cannot be seen with human eyes. Scientists use satellites and telescopes in space to see the high-energy light.

Could a Black Hole Destroy Earth?

Black holes do not go around in space eating stars, moons and planets. Earth will not fall into a black hole because no black hole is close enough to the solar system for Earth to do that. Even if a black hole the same mass as the sun were to take the place of the sun, Earth still would not fall in. The black hole would have the same gravity as the sun. Earth and the other planets would orbit the black hole as they orbit the sun now. The sun will never turn into a black hole. The sun is not a big enough star to make a black hole.

How Is NASA Studying Black Holes?

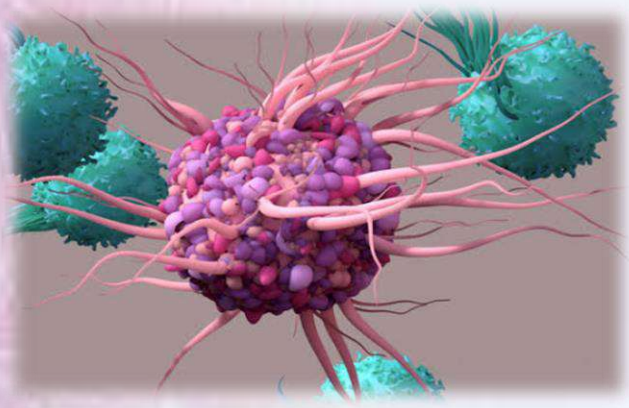
NASA is using satellites and telescopes that are traveling in space to learn more about black holes. These spacecrafts help scientists answer questions about the universe.

Name- Aanchal Rani

Class-B.Sc. C.S., Sem IV

Roll No. -22101

CANCER BIOTECHNOLOGY



Cancer biotechnology is a rapidly evolving field that combines the principles of biotechnology and medicine to develop new cancer treatments. The goal of cancer biotechnology is to understand the underlying biological mechanisms of cancer and to use this knowledge to develop new therapies that target the specific genetic and molecular changes that occur in cancer cells.

One of the most promising areas of cancer biotechnology is the development of cancer vaccines. Cancer vaccines are designed to stimulate the immune system to attack cancer cells, and they can be used to prevent cancer from developing or to treat existing cancer. Cancer vaccines are currently being developed for a wide range of cancers, including lung cancer, prostate cancer, cervical cancer and ovarian cancer.

Another area of cancer biotechnology that is attracting significant attention is the use of gene therapy to treat cancer. Gene therapy involves the delivery of genetic material to cancer cells to correct genetic mutations or inhibit the growth of cancer cells. This approach is particularly promising for the treatment of inherited cancer syndromes or cancers that are caused by specific genetic mutations. Cancer biotechnology also includes the development of new imaging techniques that can detect cancer at an early stage and monitor treatment response. This includes molecular imaging which can detect molecular changes in the cancer cells, and it can also be used for targeted drug delivery.

Another area of cancer biotechnology is the development of cancer-specific drugs that target specific molecular pathways that are involved in cancer cell growth and survival. These drugs, called targeted therapies, are designed to inhibit the activity of specific proteins or pathways that are involved in cancer cell growth and survival. This approach is particularly effective in treating cancers that are driven by specific genetic mutations, such as certain forms of melanoma and lung cancer. Cancer biotechnology is a rapidly evolving field with many exciting new developments and therapies in the pipeline. The use of biotechnology in cancer research is expected to continue to revolutionize the way we diagnose, treat and prevent cancer. The amalgamation of biotechnology and medicine will lead to new treatments that are more effective, less toxic and more personalized to the patient.

In conclusion, cancer biotechnology is a promising field that offers many new and innovative therapies for cancer. By understanding the underlying biology of cancer, scientists and researchers are developing new treatments targeting specific genetic and molecular changes in cancer cells. This approach improves the prognosis for cancer patients and is expected to lead to new, more effective treatments.

Name- Sehajdeep Saini
Class-B.Sc. Biotechnology, Sem- IV
Roll No.-23108

The Power of Nano Liquid Urea: A Breakthrough in Agriculture

In recent years, agriculture has seen a significant shift towards more efficient and sustainable farming practices. A new product is helping to drive this change: Nano Liquid Urea. This innovative fertilizer is designed to provide crops with the essential nutrients they need to grow while reducing fertilizer waste and improving the overall efficiency of agriculture.

What is Nano Liquid Urea? Nano Liquid Urea is a type of urea fertilizer that has been engineered on a nanoscale. The tiny size of the particles allows for improved nutrient uptake by crops, resulting in faster growth and improved yields. This makes it a more efficient form of fertilizer, as it reduces the amount of fertilizer needed to achieve the same results compared to traditional urea fertilizers.

Advantages of Nano Liquid Urea

1. Increased Efficiency: The nanoscale particles of Nano Liquid Urea are quickly absorbed by crops, leading to faster growth and higher yields. This makes it a more efficient fertilizer than traditional urea fertilizers.
2. Reduced Fertilizer Waste: The improved nutrient uptake of Nano Liquid Urea reduces the amount of fertilizer required, helping to reduce fertilizer waste and protect the environment.
3. Enhanced Plant Health: The increased efficiency of Nano Liquid Urea leads to healthier plants, with improved root development, stronger stems, and larger leaves.
4. Increased Food Quality: The improved plant health and efficiency of Nano Liquid Urea results in higher quality crops, with improved flavor, appearance, and nutritional content.

The Future of Nano Liquid Urea represents a breakthrough in agriculture, providing farmers with a more efficient and sustainable way to grow crops. As the world faces increasing demands for food and resources, it is becoming increasingly important to find innovative solutions to improve the efficiency of agriculture. Nano Liquid Urea is poised to play a major role in this effort, helping to ensure a sustainable food supply for future generations. In conclusion, Nano Liquid Urea is an innovative and efficient form of fertilizer that is changing the face of agriculture. With its ability to reduce fertilizer waste and improve plant health, it represents a step forward in the pursuit of sustainable and efficient food production. As this technology continues to evolve, it has the potential to revolutionize the way we grow and produce food.

Name -Nandini Kumari Singh
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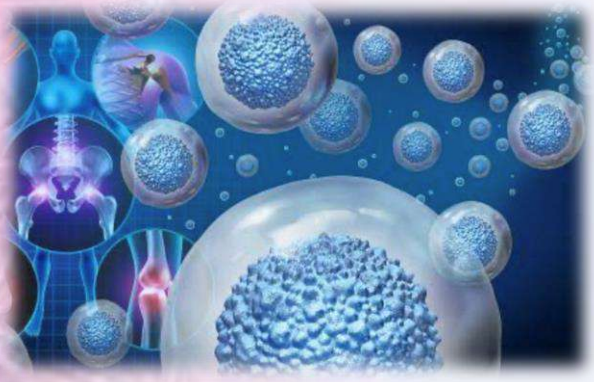
STEM CELL BIOLOGY

Stem cell biology is the study of the unique properties and behaviour of stem cells, which are undifferentiated cells that can self-renew and differentiate into various types of specialized cells. This field of biology is of great interest because of the potential for stem cells to be used in regenerative medicine and tissue engineering. Stem cells can be broadly classified into two main categories: embryonic stem cells and adult stem cells. Embryonic stem cells are derived from the inner cell mass of a blastocyst, an early stage of embryonic development, while adult stem cells are found in various tissues and organs throughout the body.



Embryonic stem cells can differentiate into all cell types of the body, a property known as pluripotency. This makes them a powerful tool for regenerative medicine and tissue engineering, as they can be used to create replacement cells and tissues for patients with various diseases and injuries. Adult stem cells, on the other hand, are more limited in their differentiation potential and are typically found in specific tissues such as blood, skin, and the nervous system. They can be used to replace or repair damaged cells and tissues in a specific area of the body. One of the most promising applications of stem cell biology is in the treatment of diseases such as cancer and diabetes. Researchers are working on developing therapies that use stem cells to replace damaged or destroyed cells, thereby reversing the progression of these diseases.

Another area of research is regenerative medicine, where stem cells are used to repair or replace damaged tissues and organs. This has the potential to revolutionize the treatment of diseases such as heart disease, spinal cord injuries, and degenerative disorders like Alzheimer’s disease. Despite the many potential benefits of stem cell biology, there are also ethical concerns surrounding the use of embryonic stem cells. Researchers are addressing these concerns by developing alternative sources of stem cells, such as induced pluripotent stem cells, which can be derived from adult cells.

In conclusion, stem cell biology is a rapidly developing field with the potential to revolutionize the treatment of many diseases and injuries. Further research in this field is

crucial to fully understand the properties and behaviour of stem cells and how they can be used to improve human health.

Name- Sehajdeep Saini
Class-B.Sc. Biotechnology, Sem- IV
Roll No.-23108

The Effect of Global Change on Freshwater Ecosystems

The ocean and freshwater ecosystems are in a constant state of flux as a result of climate change. Managing this change is a difficult task given the magnitude of the problem. However, it is possible to maintain healthy ecosystems. This article describes the mechanism that are in place to maintain healthy ecosystems, and also discuss what can be done to prevent the collapse of freshwater ecosystems. The world is experiencing a global change in climate. This change may affect the freshwater system in a number of ways, including the depletion of freshwater resources. Freshwater ecosystems are changing and there are some changes that are good, while others are not so good. One of the key changes is the increase in the number of people living in coastal countries. This has led to the increased use of freshwater resources. The increase in freshwater use has led to the increase in the number of saltwater intrusion and the decrease in freshwater quantity. This is a problem because freshwater ecosystems are sensitive to change. The changes to freshwater ecosystems have a number of consequences. One is that freshwater ecosystems are changing the climate in a number of ways. These changes are not so good and could lead to global changes in climate. Climate change is changing the world. It is causing changes to the climate, weather patterns and ecosystems. One of the most noticeable changes is the effect it has on freshwater ecosystems. Freshwater ecosystems are the main source of drinking water for the world and they are also the most sensitive to changes in climate and weather. Climate change is causing a decrease in freshwater availability, which is threatening the livelihood of many. It is also causing changes in the ecosystem that could lead to extinction. The effects of human-induced

change on freshwater ecosystems are now well-documented. The impact of human-induced change on freshwater ecosystems can be seen in the following ways: -

- The transformation of the natural landscape
- The destruction of the freshwater habitat
- The pollution of the freshwater habitat.

The effects of global change on freshwater ecosystems are often overlooked. However, this is a huge problem as freshwater ecosystems are vital for the survival of many species. Global change has had a huge impact on freshwater ecosystems by altering the climate and increasing the amount of pollutants in waterways. When these changes are combined, they have the potential to impact the survival of many species. It is important to take action and try to conserve these ecosystems to ensure that they are able to sustain the life of many species.

Name-Muskaan Rana
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Roll No.- 25059

HYDROPONICS

Hydroponics is basically growing plants without soil. It is a more efficient way to provide food and water to your plants. Plants don't use soil – they use the food and water that are in the soil. Soil's function is to supply plants nutrients and to anchor the plants' roots. In a hydroponic garden, you provide your plants with a complete nutrient formula and an inert growing medium to anchor your plants roots so they have easier access to the food and water. Because the food is dissolved in water, it goes directly to the roots. Plants grow faster and are ready for harvest sooner. You can grow more plants in the same space as you can with a soil garden, and since there is no soil, there is no worry about soil-borne diseases or pests and no weeding. Hydroponics is the growing of plants in a liquid nutrient solution with or without the use of artificial media. Hydroponics uses 20 times less water than soil based gardening. Environment is sterile,

which means no pesticides. Hydroponics uses 20% less space for growing. The system water can be reused, allowing you to conserve water. Nutrient balance is done by using Nutrition Solutions. Harvesting is easier. No mulching, tilling, changing of soil and weeding. No shipping in fruits and vegetables from rural areas, metropolitan areas can have their own hydroponic gardens grown on rooftops, warehouses, or underground. Hydroponic gardening may be the key to fresh produce in big cities. Many big cities like Paris, New York City, and London are already experimenting with hydroponics. It's a more efficient and sustainable way of gardening, as there's less space required to grow plants, and the water used in the hydroponic system is recycled. You can set up your own mini-farm in your house or garden with hydroponic gardening. Hydroponic gardens can even be set up vertically to save more space. You can grow your favourite fruits and vegetables at home, and if you set up your garden indoors with a grow light—all-year-round! Imagine being able to pick your own delicious fruits and vegetables at home instead of having to go to the store. Be mindful of the growing conditions for each plant; some require more light than others, and ideal pH conditions can vary. But the problem is putting together a hydroponic system isn't cheap. Constant monitoring is required. Hydroponic systems are vulnerable to power outages. Micro-organisms that are water-based can creep in rather easily. Growing a hydroponic garden demands technical expertise. Production of hydroponics is limited compared to field conditions. If a disease appears, all plants in the system will be affected.

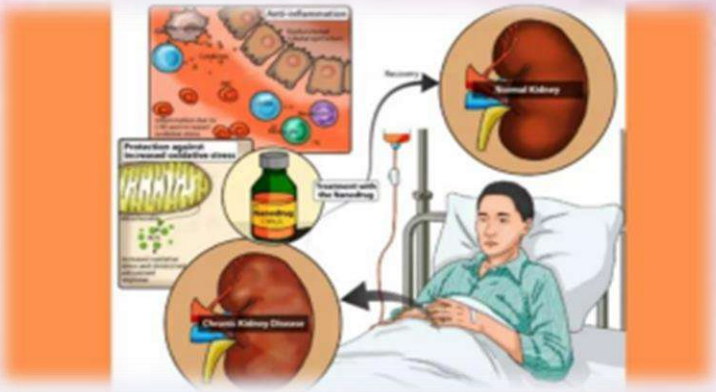
Hydroponic farms offer a pathway towards a more sustainable food ethic that prioritizes the health of our food, bodies and environment without the heavy use of chemicals. Hydroponic farming can be great way to economically grow sustainable organic food. The principle disadvantage of hydroponics, relative to conventional open field agriculture, are the high costs of capital and energy inputs, and the high degree management skill required for successful production.

Name-Deepika
Class-M.Sc. Botany, Sem-IV
Roll No. 25057

REDOX MEDICINE TECHNIQUE FOR CKD

Chronic kidney disease (CKD) is a serious medical condition that is characterized by a progressive decline in kidney function. Oxidative stress (often originating from infection

pollution, stress, and irregular lifestyle) plays an important role in renal damage; it is characterized by increased intracellular levels of reactive oxygen species (ROS), which are free radicals generated as a by-product of oxidation. ROS is linked with tissue damage, inflammation and increase in the risk of degenerative diseases. ROS-regulating mitochondria are highly susceptible to damage due to oxidative stress. In order to maintain the cellular balance of these oxidative molecules, a safe, symptomatic, and effective therapeutic strategy is needed. A previous report suggests that metal oxide nano particles with electron-donating and accepting potential exhibit antioxidant activity by preventing the damage caused by free radicals to cells. Based on this, cellular studies were conducted using human embryonic kidney (HEK 293) cells. During in vitro studies, it was observed that the C-Mn_3O_4 NP complex preserved normal cell architecture by maintaining redox balance in the cells. Moreover, it helped to restore the mitochondrial membrane potential by inhibiting the stimuli that trigger apoptosis (cell death). This, in turn, increased the cell viability index. In this regard, for in vivo studies, the cis platin-induced C57BL/6j mouse model of CKD was used. The study results showed that the C-Mn_3O_4 NP complex exhibited a scavenging activity against ROS in the mitochondria. It inhibited opening of the mitochondrial permeability transition pore, and ATP depletion, thereby preventing mitochondrial dysfunction. As a result, the morphology and physiological function of the kidney were maintained. This was indicated by the fact that the levels of CKD markers (serum urea, plasma creatinine, increased blood urea nitrogen and glomerular filtration rate) returned to homeostatic conditions. Additionally, the nano particles efficaciously mitigated the severe inflammatory responses originating from CKD. While explaining the therapeutic mechanism of the nano particles, Adhikari indicates that, “The findings suggest that both the mechanisms (ROS scavenging and mitochondrial protection) take place simultaneously.”



Name-Anjali
Class- M.Sc. Botany, Sem-IV
Roll No. 25069

Why microbes in the deep ocean live without sunlight?

A world first study reverses the idea that the bulk of life in the ocean is fuelled by photosynthesis via sunshine, revealing that many ocean microbes in fact get their energy from hydrogen and carbon monoxide. It has always been a mystery as to how microbes growing in deepest parts of the sea survive, with no sunlight. A new study, from researchers at the Monash University published in the journal Nature Microbiology, shows that a distinct process called chemosynthesis – growth using inorganic compounds. The five-year study, led by Dr Rachael Lappan and Professor Chris Greening from the Biomedicine Discovery Institute, reveals that two common gases – hydrogen and carbon monoxide – serve as the fuel for trillions of microbes in the ocean from the tropics to the poles. According to Professor Greening, until now most scientists have believed that ocean microbial life is primarily driven by photosynthesis. “But what about those regions so deep that light can’t penetrate or so nutrient-poor that algae can’t thrive? This study shows that instead chemosynthesis is dominant in these regions. Hydrogen and carbon monoxide in fact “fed” microbes in all regions from urban bays to around tropical islands to hundreds of metres below the surface. Some can even be found beneath Antarctica’s ice shelves.

The study involved combining chemical measurements during oceanic voyages with laboratory. The research team also extensively used Meta genomic sequencing, which tells us the genetic blueprints of all of the microbes present in a given region of the ocean. Dr Lappan found the genes that enable hydrogen consumption across eight distantly related types of microbes, known as phyla, and this survival strategy becomes more common the deeper they live. The surface layers of the world’s oceans generally contain high levels of dissolved hydrogen and carbon monoxide gases due to various geological and biological processes. So it made sense that oceanic bacteria used the same gases as their terrestrial cousins. These findings provide insights into how life evolved. Professor Greening concluded that the first life probably emerged in deep-sea vents using hydrogen, not sunlight, as the energy source.

It’s incredible that, 3.7 billion years later, so many microbes in the oceans are still using this high-energy gas and we’ve completely overlooked this until now.

Name-Simran

Class-M.Sc. Botany, Sem-II

Roll No.-25105

Life on Mars

Four and a half billion years ago, a rock was formed on Mars by some volcanic process. Half a billion years later, this rock was broken into smaller pieces by a meteorite impact nearby. Some ground water also entered the rock. 16 million years ago, an asteroid hit Mars somewhere near where this rock was. The impact threw pieces of the rock into space. One 2 Kg piece of rock orbited the Sun until 13,000 years ago, when it came close to the Earth. This piece crashed onto an Antarctic glacier. Over 13,000 years, it reached the Allan Hills region of Antarctica, buried inside the ice. In 1984, this meteorite was discovered and named ALH84001. A large number of people worked out this history of the meteorite that we just narrated. This year, a team led by David McKay of the American space organization NASA, suggested that there seemed to be signs that life may have existed on this rock in some bygone era. The meteorite has some organic molecules, of the same family as naphthalene (which is used in mothballs). When bacteria decay, such compounds are produced. Many meteorites do have such compounds. The meteorite has iron oxide (magnetite) of the sort which some bacteria on earth secretes. It has iron sulphide, which is produced by some anaerobic bacteria. The meteorite has some balls of carbonate material, which may be formed by some material, which may be formed by some living thing. On the other hand, almost all earth bacteria are 100 times larger than this material. The meteorite may contain very small fossils (less than hundred millionth of a millimetre). Nanobacteria are this size.

In 1961, another meteorite was found to have signs of life. But soon these were discovered to be grains of pollen and particles of furnace ash. The signs of life turned out to be from earth itself. This could be the case for the Antarctic meteorite too. What makes scientist more hopeful is that some of these items mentioned are within cracks, and the cracks could only have been formed before the meteorite came to rest in Antarctica. So maybe, just maybe, the signs of bacterial life that we see are from when the rock was on Mars. In 1976, the Viking spacecraft failed to find any such bacteria on Mars. But maybe they landed in the lifeless part of Mars. Or maybe bacteria were present on Mars millions of years ago, but aren‘t there now. Scientists are looking at ALH84001 very, very carefully. US President has promised support for a new NASA spacecraft to Mars.

Name-Priyanka
Class-M.Sc. Botany, Sem-II
Roll No.-25101

Shukrayaan

India's first interplanetary mission 'Mangalyaan' (Mars vehicle) was launched in 2013 and became the world's first-ever mission to enter Martian orbit in the maiden attempt, back in 2014. Since then, there have been mentions of India's follow-up Mars mission and also a mission to Venus. In 2022, it was revealed in the Indian Parliament that the Venus mission was being conceptualised and that feasibility studies were being carried out At a recent event hosted by the Indian Institute of Astrophysics, P Sreekumar of the Space Science Programme Office, ISRO, had elaborated that the Venus mission was aimed at studying the Venusian atmosphere, mapping surface topography, using radar to probe the surface and understanding the Venus-Sun interaction.

Most intriguing questions about Venus

P Sreekumar stated "What makes Earth's twin Venus lose most of its water? Greenhouse effect? The surface composition of Venus is unknown as there are thick clouds at an altitude of 60 kilometres. What causes high-velocity winds at a slow-rotating planet? What is the unknown absorber of UV in the Venus clouds? Is there lightning on Venus?" Tracing the work of the Venus mission plan, Sreekumar mentioned that the Venus mission was proposed back in 2012. On the current status of the mission, he stated "Now, we're waiting for formal approval and money, otherwise, all set to go. The mission was originally scheduled for launch in 2023 but the favourable orbital alignment, proximity conditions to undertake a Venus mission occurs once in 19 months. Right now, the 2031 window looks good" he said.

Listed Programs

He added that 2031 would be the year when NASA and European Space Agency would also be landing their missions on Venus, whereas China could attempt their mission sometime in 2026- 27. ISRO is expected to have a busy schedule in 2023 with big-ticket missions such as Chandrayaan-3 (3rd Lunar mission), Aditya-L1(mission to study sun), a host of commercial launches, launches of the new SSLV rocket and major test launches as part of the Gaganyaan Human Spaceflight programme.

Name-Aditi Sharma
Class -M.Sc. Botany, Sem-II
Roll No.-25104

Why are stars disappearing from the sky?

Have you ever noticed the number of stars that you can see with your naked eyes in the sky has reduced significantly over the last decade? New research shows that it’s actually due to the increasing light pollution worldwide. Light pollution is a phenomenon where the sky glows at night due to artificial lighting. BBC reported that a group of amateur astronomers and citizen scientists spent the last 12 years studying the sky to reach this conclusion. The amount of light that humans emit in the sky has constantly increased by 10%

every year, as per the researchers. Dr Christopher Kyba, a scientist from the German Research Centre for Geosciences in Potsdam, was quoted by the BBC as saying “Our view of the stars is disappearing”.

LED lighting revolution contributing to light pollution.

The European Space Agency in a study last year revealed that the LED lighting revolution throughout the world exacerbated the light pollution problem. The cheaper and better the lightning, the more it is wasted. Decorative lights, advertisement boards, street lights and lights on high-rise buildings have made our sky brighter and light pollution problem worse.

Light pollution: A big threat to humans

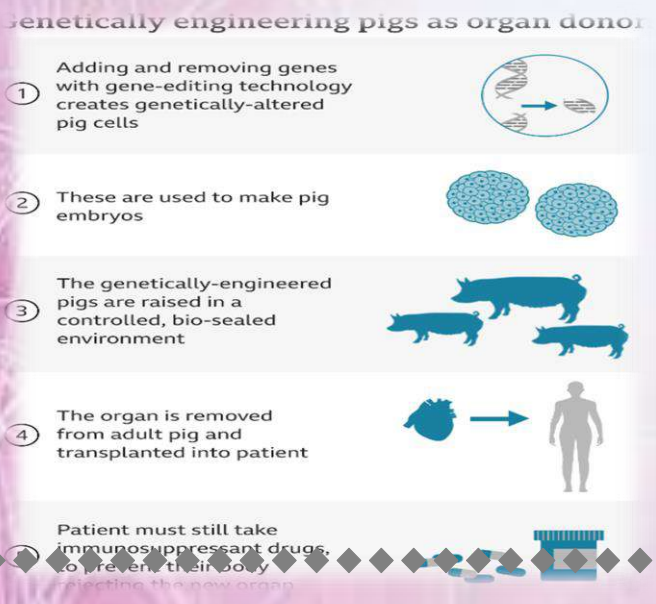
Light pollution doesn’t just spoil the mesmerising view of the moon and stars, it also gravely impacts the sleeping behaviour of humans. Excessive lighting is linked to disrupted sleeping patterns and bad health, not just in humans but animals also. One study even linked excessive lighting to the local insect decline.

Light pollution reveals massive wastage of energy

Experts say that sky glow and sky brightness show how a tremendous amount of energy is being wasted every day, without people and governments even acknowledging this massive loss.

Name-Avantika
Class-M.Sc. Botany, Sem-II
Roll No.-25103

Xenotransplantation



Xeno transplantation is any procedure that involves the transplantation, implantation or infusion into a human recipient of either (a) live cells, tissues, or organs from a nonhuman animal source or (b) human body fluids, cells, tissues or organs that have had ex vivo contact with live nonhuman animal cells, tissues or organs.

Why pigs are most used for Xeno- transplantation?

- Pigs are increasingly becoming popular candidates for organ transplantation.
- Pigs offer advantages over primates for organ procurements, because they are easier to raise and achieve adult human size in six months. Also, pigs have large litters. Hence pigs could provide an unlimited supply of organs, tissues, and cells.
- Pig organs have similarities to human organs in respect of anatomy and physiology. For instance, physiologically, cardiac output and stroke volume, which are major indicators of cardiac function, have been reported to be comparable in pigs and humans.

SUCCESS RATE:

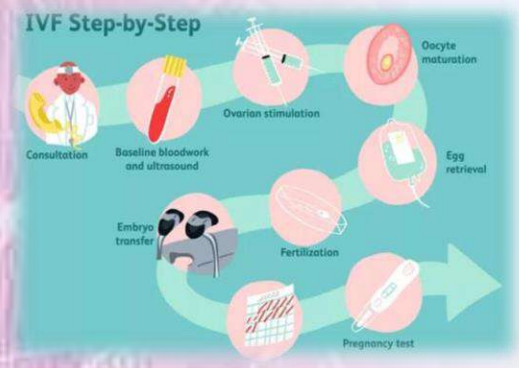
The first heart xenotransplant was conducted on Sunday, June 19, 2022 and no signs of rejection observed in either organ. Although the potential benefits are considerable, the use of xenotransplantation raises concerns regarding the potential infection of recipients with both recognized and unrecognized infectious agents and the possible subsequent transmission to their close contacts and into the general human population. of public health concern is the potential for cross-species infection by retroviruses, which may be latent and lead to disease years after infection. Moreover, new infectious agents may not be readily identifiable.

Name-Gagandeep Kaur

Class –M.Sc. Botany, Sem-IV

Roll No.- 25065

In vitro fertilization (IVF)



In vitro fertilization (IVF) is the joining of a woman's egg and a man's sperm in a laboratory dish. In vitro means outside the body. Fertilization means the sperm has attached to and entered the egg. There are five basic steps to IVF:

Step 1: Stimulation, also called super ovulation

Medicines, called fertility drugs, are given to the woman to boost egg production. Normally, a woman produces one egg per month. Fertility drugs tell the ovaries to produce several eggs.

Step 2: Egg retrieval

A minor surgery, called follicular aspiration, is done to remove the eggs from the woman's body. The surgery is done in the doctor's office most of the time. The woman will be given medicines so she does not feel pain during the procedure. Using ultrasound images as a guide, the health care provider inserts a thin needle through the vagina into the ovary and sacs (follicles) containing the eggs. The needle is connected to a suction device, which pulls the eggs and fluid out of each follicle, one at a time.

Step 3: Insemination and fertilization

The man's sperm is placed together with the best quality eggs. The mixing of the sperm and egg is called insemination. Eggs and sperm are then stored in an environmentally controlled chamber. The sperm most often enters (fertilizes) an egg a few hours after insemination.

Step 4: Embryo culture

When the fertilized egg divides, it becomes an embryo. Laboratory staff will regularly check the embryo to make sure it is growing properly. Within about 5 days, a normal embryo has several cells that are actively dividing.

Step 5: Embryo transfer

Embryos are placed into the woman's womb 3 to 5 days after egg retrieval and fertilization. The procedure is done in the doctor's office while the woman is awake. The doctor inserts a thin tube (catheter) containing the embryos into the woman's vagina, through the cervix, and up into the womb. If an embryo sticks to (implants) in the lining of the womb and grows, pregnancy results.

Name-Neha

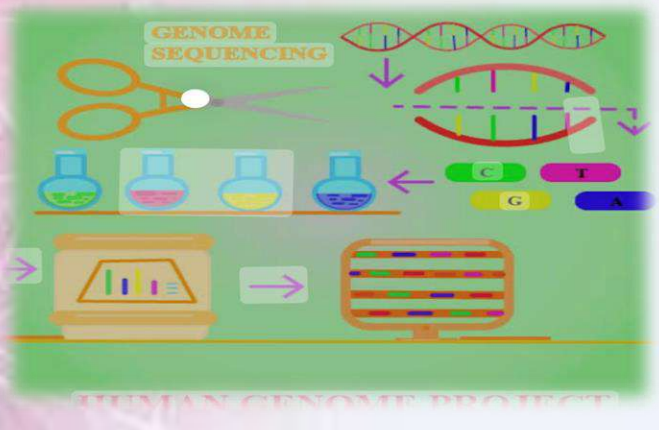
Class-M.Sc. Botany, Sem-IV

Roll No- 25060

Human Genome Project

The Human Genome Project was a landmark global scientific effort whose signature goal was to generate the first sequence of the human genome. In 2003, the Human Genome Project produced a genome sequence that accounted for over 90% of the human genome. It was as close to complete as the technologies for sequencing DNA allowed at the time. The project was critical for advancing policies and earning increased support for the open sharing of scientific data. Concerns and questions about sequencing the human genome helped to

usher in a greater emphasis on ethics in biomedical research. The project was atypical for biomedical research, in that the researchers' work was driven by a desire to explore an unknown part of the biological world — as opposed to first formulating a theory or hypothesis. The sequence of the human genome generated by the Human Genome Project was not from a single person. Rather, it reflects a patchwork from multiple people whose identities were intentionally made anonymous to protect their privacy.



The project researchers used a thoughtful process to recruit volunteers, acquired the informed consent, and collect their blood samples. Most of the human genome sequence generated by the Human Genome Project came from blood donors in Buffalo, New York; specifically, 93% from 11 donors, and 70% from one donor.

As the goals of the human genome project were achieved, it led to great advancement in research. Today, if any disease arises due to some alteration in a certain gene, then it could be traced and compared to the genome database that we already have. In this way, a more rational step could be taken to deal with the problem and can be fixed with more ease.

Name-Sonia

Class-M.Sc. Botany, Sem-IV

Roll No- 25062

JAMES WEB TELESCOPE

Launched in December 2021 after decades of work, NASA's $10 billion James Webb Space Telescope- a collaboration between the US, Europe, and Canada is the largest telescope ever sent to space and some 100 times more powerful than its

predecessor, the Hubble Space Telescope. It is also specifically designed to detect infrared radiation, allowing it to cut through dust and look far back in time to a period when the universe's first stars and galaxies formed. JWST is tailor-made for this kind of astronomical time travel. Its main mirror is 21 feet, around three times the diameter of Hubble's, giving it far greater resolving power. It carries a sunshield as big as a tennis court to protect its mirror and instruments from the heat and light of the sun. As it gets to space, engineers designed JWST's mirror and sunshield to fold up so they would fit inside a rocket fairing, unfolding after launch as the telescope made its journey to its final orbit 1.5 million kilometres from Earth. Astronomers hope that with JWST, they will be able to piece together how the universe's first galaxies came to be following the Big Bang. But that is not JWST's only goal. It could provide unprecedented insight into planets in other solar systems, allowing us to work out what their atmospheres are made of. It will witness the birth of new worlds, take magnificent images of nebulae, probe the structure of galaxies, and much, much more. New discoveries rain down almost every day and will do so for the lifetime of the telescope, estimated at more than 20 years. Researchers confirmed an exoplanet, a planet that orbits another star, using NASA's James Webb Space Telescope for the first time.

On Jan 9, 2023 - A new analysis of distant galaxies imaged by NASA's James Webb Space Telescope shows that they are extremely young and share some remarkable similarities to "green peas," a rare class of small galaxies in our backyard.

Name-Navneet Kaur
Class-M.Sc. Botany, Sem-IV
Roll No.-25063

'Plasticosis': Scientists find new disease in birds caused by consumption of plastics

Scientists have identified a brand new illness in birds dubbed "Plasticosis" that is exclusively brought on by ingesting plastics. Birds that had consumed plastic have been left with scarred tissues in their digestive tracts, according to researchers in Australia and the UK. The sickness is brought on by the "permanent presence of plastic in the body's digestive system," which can result in chronic inflammation and even the production of scar tissue, claims the study, which was published in the journal of Hazardous Materials. In 30 flesh-footed

shearwater birds, including 21 fledglings between 80 and 90 days old that had recently passed away, the researchers discovered plastic residues. These were gathered in Australia's Lord Howe Island. They examined the birds closely and discovered microplastic fragments inside their bodies. It was discovered that a bird had devoured 12.5% of its body weight in plastic. According to the study, a bird's tissues became more scarred, the more plastic it consumed. They claim that the condition can cause the tubular glands in the proventriculus to gradually degenerate. The loss of these glands may make the birds more susceptible to parasites and infections, as well as impair their capacity to properly digest food and absorb some vitamins. To make it apparent that plastic in the environment was the source of the fibrotic disease, scientists gave it the name plasticosis. While these birds may appear healthy from the surface, they may not be doing well within. This study, in which for the first-time stomach tissue has been examined in this way, demonstrates that consuming plastic can seriously harm the digestive systems of these birds, according to a quote from Dr. Alex Bond, principal curator, in-charge of birds at the Natural History Museum, claimed that as plastic pollution is spreading throughout all environments and plastic emissions are rising, all creatures are susceptible to exposure to plastic.

Name - Anamika Sut
Class-M.Sc. Botany, Sem-II
Roll No.- 25112

Titanium Heart: The Next Frontier in Cardiac Care

Titanium is a versatile metal that has been used for various medical applications for many years. It is biocompatible, corrosion-resistant, and has a high strength-to-weight ratio, making it an ideal material for medical devices. One such application is in the manufacturing of artificial heart valves and even entire titanium hearts.

The human heart is a remarkable organ that beat approximately 100,000 times a day, pumping oxygen-rich blood to every part of the body. However, due to a variety of factors such as aging, genetics, and lifestyle choices, the heart can become diseased or damaged, leading to life-threatening conditions such as heart failure, heart attack, and arrhythmias.

Over the years, medical science has made significant strides in the treatment of these conditions. From drugs to surgery, a range of therapies exists to help manage cardiac ailments. However, there is one emerging technology that is poised to revolutionize cardiac care–the titanium heart. A titanium heart is an artificial heart made entirely of titanium. Unlike conventional mechanical heart valves, which are used to replace damaged heart valves, a titanium heart is a complete replacement for the entire heart. It is designed to mimic the structure and function of the natural heart, allowing for normal blood flow and oxygenation. The development of the titanium heart is a significant breakthrough in the field of cardiac care. One of the main advantages of a titanium heart is that it eliminates the need for a heart transplant. Currently, heart transplants are the only viable treatment option for end-stage heart failure, but the supply of donor hearts is limited. This means that many patients die while waiting for a suitable donor heart. With a titanium heart, this problem is eliminated entirely, as the artificial heart can be implanted whenever needed, without the need for a donor.

Another significant advantage of a titanium heart is its durability. Unlike the natural heart, which can wear out over time due to factors such as age and disease, a titanium heart can last for many years. This means that patients who receive a titanium heart can expect to have a longer lifespan and a better quality of life. One of the key challenges in developing a titanium heart is making it compatible with the body. The human immune system is designed to attack foreign objects in the body, such as implants. To overcome this challenge, titanium hearts are coated with a layer of biocompatible material that prevents the immune system from rejecting the implant. Additionally, the design of the titanium heart is optimized to minimize the risk of blood clots, infections, and other complications. The development of the titanium heart is still in the early stages, and there are several hurdles that need to be overcome before it becomes a mainstream treatment option. One of the main challenges is the cost of the procedure, which

is currently prohibitively expensive. Additionally, the long-term safety and efficacy of the titanium heart need to be demonstrated through rigorous clinical trials.

Name-Aahana Sethi
Class- M.Sc. Botany, Sem-IV
Roll No.-25056

SCIENCE FACTS

1. There are trees on Earth than stars in our Galaxy: NASA expires believe there could be anywhere from 100 billion to 400 billion starts in a Milky way galaxy, Snopes reports Howler a 2015 paper published in journal Nature estimated that the word is much higher 3.04 trillion.
2. Oxygen has Colour: As a gas oxygen is odourless and colourless in its liquid and solid forms, however, it looks pale Blue.
3. Only one letter doesn't appear in Periodic table: It's the letter J.
4. Bananas are Radioactive: Bananas contain Potassium and since Potassium decays, that makes them slightly radioactive. But it's nothing you need to worry about you need to eat 10,000,000 bananas at once to die of radiation poisoning.
5. You can make Balls fly: If you spin a ball when you drop it, it will fly through the air as it falls this is called The Magnus Effect, and it makes playing tennis and soccer a whole easier.
6. Helium can also work against Gravity: When helium is cooled to extreme temperature just a few degrees away from absolute zero it turns into a super fluid, meaning it can flow without friction it can climb up and over the sides of glass.

7. Men are more likely to be colour blind than women: The genes responsible for the most common type of colour blindness are found on X-chromosome, the National Eye Institute explains. Even if women have the genes one of their two X-chromosomes does a proper functioning, gene on the other one make up for that loss. If men inherit the gene on their only X-chromosome, they will become colour blind.

8. You can't taste food without Saliva: In order for food to have taste, chemicals from the food must first dissolve in saliva it's only once they've been dissolved in a liquid that the chemicals can be detected by receptors on taste buds. During this process, some salivary constituents chemically interact with taste substance.

9. Your fingernails grow faster in summers than they do during any other season.

10. The Eiffel Tower is up to 15 cm taller in summer due to Thermal Expansion.

Name-Amrita

Class-M.Sc. Botany, Sem-II

Roll No.-25108

Lithium- The white Gold

Lithium - the lightest metal is also known as white Gold. Did you know why it has the status of gold. Usability and demand. India found its massive Li reserves in J&K. A reserve totalling 5.9 million tonnes discovered in the Reasi distt. of Jammu by (GSI) Geological survey of India.

Bolivia has the world's largest known Li reserve (21 million tonnes). India ranks 7th with 5.8 million tonnes. Now, India's import of EV batteries be significantly reduced. Lithium is a key component in batteries. To stride in the direction of sustainability now India has got what it needed the most to make itself self-reliant nation and self-reliant economy.

But not to forget that Li-ion batteries are categorized as hazardous waste material due to their toxic chemical composition that makes the recycling process difficult. So, one should not expose the used batteries to water or moisture as Li-ion batteries can cause fires. Instead, they should be taken to separate recycling household hazardous waste collection points. Lithium,

whose silvery-white color tarnishes on oxidation when exposed to air, is the most electropositive metal (−3.04 V versus a standard hydrogen electrode), the lightest (M = 6.94 g mol−1) and the least dense (ρ = 0.53 g cm^{-3}) solid element at room temperature, and is also highly flammable. Owing to this high reactivity, lithium is present only in compounds in nature either in brines or hard rock minerals and must be stored under anhydrous atmospheres, in mineral oil or sealed evacuated ampoules.

Their particular physical, chemical and electrochemical properties make lithium and its compounds attractive to many fields. Apart from the recent advent of lithium-based batteries, lithium niobate ($LiNbO_3$) is an important material in nonlinear optics. Engineers use lithium in high-temperature lubricants, to strengthen alloys, and for heat-transfer applications. It is also widespread in the fine chemical industry, as organo-lithium reagents which are extremely powerful bases and nucleophiles and are used to synthesize many chemicals. Its effect on the nervous system has also made lithium attractive as a mood-stabilizing drug, and in nuclear research tritium (^3H) is obtained by irradiating ^6Li. Annual demand has therefore grown by 7–10%, currently reaching about 160,000 tons of lithium carbonate (Li_2CO_3) per year, about 20–25% of which is for the battery sector.

Name-Deeksha
Class-B.Sc., Sem-II
Roll No.- 20231

USDA APPROVED GM-PURPLE TOMATOES

The United States Department of Agriculture (USDA) authorized the sale of genetically altered purple tomato produced by Norfolk Plant Sciences in September 2022 after determining that it was unlikely to provide a risk to plant pests. There are other purple-skinned tomatoes, but Norfolk's stands out because it has been specially developed to deliver a high level of anthocyanin, a

pigment that naturally occurs in many foods including blueberries and blackberries. With the permission, Norfolk Plant Sciences will be able to start selling purple tomato seeds to clients in the US in the spring of 2023. Professor and researcher Cathie Martin, who created the anthocyanin-rich purple tomato in 2008, finally got her wish after a protracted wait. Martin and her team induced the tomatoes to produce more anthocyanin, giving them a vivid purple hue, by using transcription factors from snapdragons. However, the flavour of the purple tomato is identical. This new strain of tomato has been designed to be more resistant to disease, to contain more nutrients, and to have a longer shelf-life than traditional varieties. The purple tomato is the result of a collaboration between the USDA, the University of Florida Institute of Food and Agricultural Sciences, and Maryland-based biotechnology company Cibus. The tomato was created using a process known as the "sense-and-antisense" gene editing technique, where two genes are edited to create a desired outcome. The purple tomato has a number of benefits. Anthocyanin is thought to have a range of health benefits, including anti-inflammatory and anti-cancer properties. It is also believed to help protect against neurological diseases, such as Alzheimer's and Parkinson's. The pigmented tomatoes contain more antioxidants than other varieties, which can help boost the immune system. The purple tomato has also been engineered to be more resistant to disease. This means that it can be grown without the use of pesticides and other chemicals, which can be damaging to the environment. The tomatoes also have a longer shelf life, so they can be stored for longer periods of time.

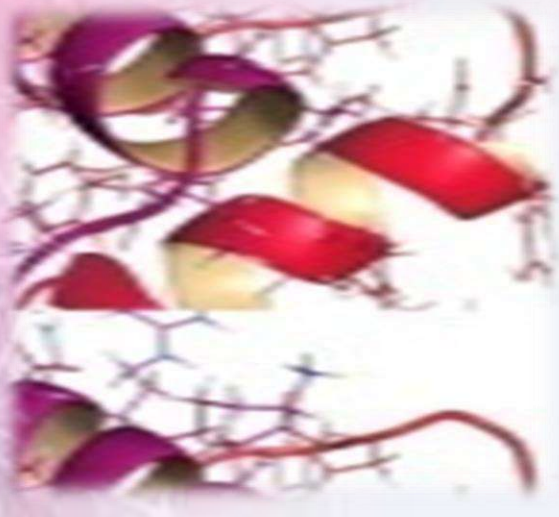
The purple tomato has been a long time in the making. It has taken years of research and development to bring the purple tomato to market. However, the USDA has now approved the tomato for sale, and it is expected to be available in stores soon. The purple tomato is just the latest example of how genetic modification can be used to create new and improved varieties of foods. As the technology advances, it is likely that we will see more and more genetically modified produce on the market. Although there are still some ethical concerns surrounding the use of gene editing, it is clear that there are many potential benefits.

Name-Anjali

Class-M.Sc. Botany, Sem-IV

Roll No.- 25064

The expanding universe of Prion disease



Prion diseases are a group of neurodegenerative disorders that affect both humans and animal. They are caused by abnormal folding of proteins in the brain, particularly the misfolding of the prion protein PRP. This led to the progressive decline in brain function involving changes in memory, behavior and movement. Eventually prion diseases are fatal. They can be acquired, inherited or sporadic. Normally prions contain about 200-250 amino acids. The mutated and infectious form is built from the same amino acids but acquires different structure. The misfolded PRPc can bind to the healthy PRPc which causes the healthy protein to fold abnormally. This results in a chain reaction that multiplies copies after copies of infectious prion. Over time molecules stack up and form long chains called amyloid fibres. Amyloid fibers are toxic to cells. Cells called astrocytes crawl through the brain digesting the dead neurons, leaving holes where neurons used to be. Due to presence of holes, brain appears sponge like, that is why prions are called Spongiform.

Prions occur in both humans and animals. They spread from animals to humans by mainly ingesting the contaminated meat most commonly beef and from human to human by cannibalism by ingesting infected brain material of infected human beings. Once entered in the body, the abnormal prion protein triggers the folding of normal prion proteins. Human prion diseases include CJD, fatal familial insomnia, kuru, GSS etc. Animal prion diseases include bovine spongiform encephalopathy (in cattle's), chronic wasting disease (in deer), scrapie (sheep), transmissible mink encephalopathy etc. Prion disease has very long incubation periods, from several months to decades. Once the symptoms are developed, they progressively worsen and there is very little we can do to treat them at that time. Common symptom of the prior diseases include difficulty with thinking, memory and judgment, personality changes like apathy, agitation and depression, confusion, disorientation, involuntary muscle spasms, loss of coordination, trouble difficulty speaking or slurred speech, impaired vision or blindness. Since prions have no cure but the treatment focus on providing supportive care. Example of this type of care includes medications to reduce

physiological symptoms including antidepressants and sedatives providing pain relief, easing muscle spasms with drugs like clonazepam. In advanced stages of disease IV fluids or feeding tube may be required.

Name: Harmandeep Kaur
Class: B.Sc. Biotechnology, Sem-VI
Roll No.- 23001

Why it took 20 years to 'finish' the human genome?

The release of the draft human genome sequence in 2001 was a seismic moment in our understanding of the human genome, and paved the way for advances in our understanding of the genomic basis of human biology and disease. But, sections were left unsequenced, and some sequence information was incorrect. Now, two decades later, we have a much more complete version, published as a preprint by an international consortium of researchers.

Technological limitations meant the original draft human genome sequence covered just the "euchromatic" portion of the genome, 92% of our genome where most genes are found, and which is most active in making gene products such as RNA and proteins. The newly updated sequence fills in most of the remaining gaps, providing the full 3.055 billion base pairs of our DNA code in its entirety. This data has been made publicly available, in the hope other researchers will use it to further their research. Much of the newly sequenced material is the "heterochromatic" part of the genome, which is more "tightly packed" than the euchromatic genome and contains many highly repetitive sequences that are very challenging to read accurately. These regions were once thought not to contain any important genetic information but they are now known to contain genes that are involved in fundamentally important processes such as the formation of organs during embryonic development. Among the 200

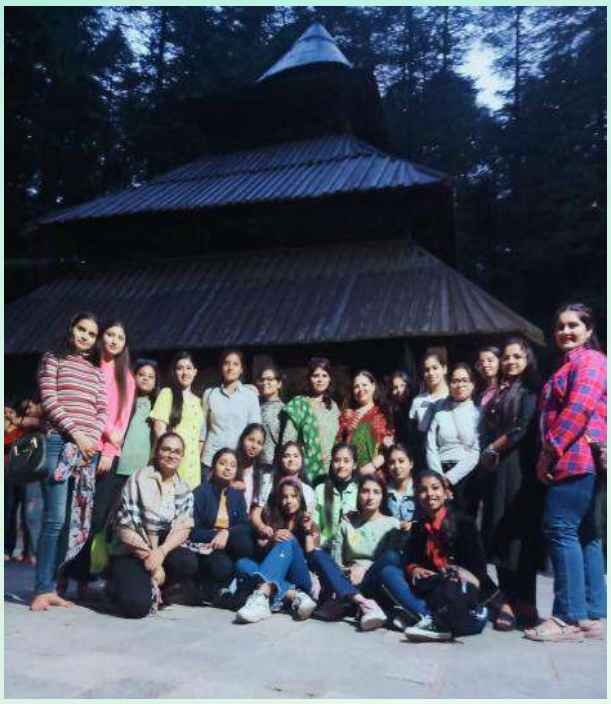
million newly sequenced base pairs are an estimated 115 genes predicted to be involved in producing proteins. Two key factors made the completion of the human genome possible:

1. Choosing a very special cell type: The newly published genome sequence was created using human cells derived from a very rare type of tissue called a complete hydatidiform mole, which occurs when a fertilized egg loses all the genetic material contributed to it by the mother. Most cells contain two copies of each chromosome, one from each parent and each parent's chromosome contributing a different DNA sequence. A cell from a complete hydatidiform mole has two copies of the father's chromosomes only, and the genetic sequence of each pair of chromosomes is identical. This makes the full genome sequence much easier to piece together.

2. Advances in sequencing technology: After decades of glacial progress, the Human Genome Project achieved its 2001 breakthrough by pioneering a method called "shotgun sequencing", which involved breaking the genome into very small fragments of about 200 base pairs, cloning them inside bacteria, deciphering their sequences, and then piecing them back together like a giant jigsaw. This was the main reason the original draft covered only the euchromatic regions of the genome only these regions could be reliably sequenced using this method. The latest sequence was deduced using two complementary new DNA-sequencing technologies. One was developed by PacBio, and allows longer DNA fragments to be sequenced with very high accuracy. The second, developed by Oxford Nanopore, produces ultra-long stretches of continuous DNA sequence. These new technologies allow the jigsaw pieces to be thousands or even millions of base pairs long, making it easier to assemble. The new information has the potential to advance our understanding of human biology including how chromosomes function and maintain their structure. It is also going to improve our understanding of genetic conditions such as Down syndrome that have an underlying chromosomal abnormality.

Name-Reema
Class-M.Sc. Botany, Sem-IV
Roll No.-25052

HMV @ Spotlight



Field Trip to Manali

ਐਚ.ਐਮ.ਵੀ. ਵਿਖੇ ਕਹਾਣੀ ਸੁਣਾਓ ਪ੍ਰਤੀਯੋਗਤਾ ਦਾ ਆਯੋਜਨ

ਜਲੰਧਰ-ਹਰਪ੍ਰੀਤ ਸਿੰਘ ਲੱਕੀਕਲ

ਹੰਸ ਰਾਜ ਮਹਿਲਾ ਮਹਾਂਵਿਦਿਆਲਾ ਦੇ ਬਾਇਓਇਨਫਾਰਮੈਟਿਕਸ ਅਤੇ ਬਾਇਓਟੈਕਨਾਲੋਜੀ ਵਿਭਾਗਾਂ ਵੱਲੋਂ ਡੀਬੀਟੀ ਸਟਾਰ ਕਾਲਜ ਸਕੀਮ ਅਧੀਨ ਕਹਾਣੀ ਸੁਣਾਓ ਪ੍ਰਤੀਯੋਗਤਾ ਦਾ ਆਯੋਜਨ ਕੀਤਾ ਗਿਆ। ਇਹ ਪ੍ਰਤੀਯੋਗਤਾ ਇਨੋਵੇਟਿਵ ਟੀਚਿੰਗ ਪੈਡਾਗਗੀ ਦਾ ਹਿੱਸਾ ਸੀ ਤਾਂ ਕਿ ਵਿਗਿਆਨਕ ਸਿਧਾਂਤਾਂ ਦੀ ਕਹਾਣੀ ਦੇ ਮਾਧਿਅਮ ਨਾਲ ਵਿਆਖਿਆ ਕੀਤੀ ਜਾ ਸਕੇ। ਪ੍ਰਤੀਯੋਗਤਾ ਵਿੱਚ ਬਾਇਓਟੈਕਨਾਲੋਜੀ ਵਿਭਾਗ ਮੁਖੀ ਡਾ. ਜਤਿੰਦਰ ਕੁਮਾਰ ਨੇ ਸਵਾਗਤੀ ਭਾਸ਼ਣ ਦਿੱਤਾ। ਪ੍ਰੋਗਰਾਮ ਦਾ ਕੈਪਿਟਲ ਨੋਟ ਬਾਇਓਇਨਫਾਰਮੈਟਿਕਸ ਸਟਰੱਕਚਰ ਦੀ ਪ੍ਰੋਫੈਸਰ ਕੀਤੀ। ਡੀਨ ਅਕਾਦਮਿਕ ਡਾ. ਨੀਮਾ ਮਰਵਾਹਾ ਅਤੇ ਡੀਨ ਰਿਸਰਚ ਡਾ. ਅੰਜਨਾ ਕਾਟੀਆ ਨੇ ਵੀ ਵਿਦਿਆਰਥਣਾਂ ਨੂੰ ਪ੍ਰੋਤਸਾਹਿਤ ਕੀਤਾ। ਐਮ.ਐਸ.ਸੀ. ਬਾਇਓਇਨਫਾਰਮੈਟਿਕਸ ਦੀ ਵਿਦਿਆਰਥਣ ਤਾਨੀਆ ਸੇਠੀ ਨੇ ਪਹਿਲਾ, ਨਵਰੀਨ ਕੌਰ ਅਤੇ ਨਿਤਿਆ ਬਾਂਗੜ ਦੀ ਟੀਮ ਨੇ ਦੂਜਾ ਅਤੇ ਭਵਿਆ, ਸਮਰਿਧੀ ਅਤੇ ਅੰਸ਼ੂਮਧਾਲ ਕੌਰ ਦੀ ਟੀਮ ਨੇ ਤੀਜਾ ਇਨਾਮ ਜਿੱਤਿਆ। ਪ੍ਰਤੀਯੋਗਤਾ ਦੇ ਜੱਜ ਸ਼੍ਰੀਮਤੀ ਕਮਲਦੀਪ ਕੌਰ ਅਤੇ ਡਾ. ਸੁਚੀ ਸਕਸੇਨਾ ਸਨ। ਇਸ ਮੌਕੇ ਤੇ ਸ਼੍ਰੀਮਤੀ ਦੀਪਸ਼ਿਖਾ, ਡਾ. ਸਚੇਤਾ ਚੌਹਾਨ, ਸੁਸ਼ੀ ਹਰਪ੍ਰੀਤ ਅਤੇ ਦੀਕਸ਼ਾ ਮਰਵਾਹਾ ਮੌਜੂਦ ਸਨ। ਸੌਜਾ, ਖੁਸ਼ ਅਤੇ ਰੋਮਕ ਨੇ ਮੰਚ ਸੰਚਾਲਨ ਕੀਤਾ।

Story Telling Competition organized by Bioinformatics Department

University Merit Positions

Exploration in Botanical Garden by Botany Department

Night Sky Watch organized by Physics Department

त करते हुए पदाधिकारी।

वाशक भलाई के लिए विज्ञान का मूल अवधारणा को प्रमाणित करने किया। यहां शिक्षिका नम्रता चोपड़ा मौजूद रहीं।

एचएमवी में मनाया नेशनल साइंस डे

भास्कर न्यूज | जालंधर

एचएमवी की सीवी रमन सोसायटी की ओर से पीएससीएसटी, एनसीटीएससी, डीएसटी तथा भारत सरकार के संयुक्त तत्वावधान में नेशनल साइंस डे का आयोजन किया। थीम ग्लोबल साइंस फॉर ग्लोबल वैलबिंग रही। मुख्यातिथि के तौर डॉ. नीलिमा जैरथ उपस्थित थीं। डॉ. नीलिमा जैरथ ने छात्राओं को संबोधित किया। उन्होंने बताया कि वैलनेस को हैप्पीनेस इंडेक्स से मापा जाता है। वहीं क्विज प्रतियोगिता में कृतिका, राशि व निशिका की टीम ने प्रथम पुरस्कार जीता। संचालन डॉ. साक्षी एवं डॉ. वंदना ने किया।

एचएमवी में कार्यक्रम के दौरान मौजूद सदस्य।

की भूमिका डॉ. नीतिका, डॉ. राखी मेहता व रमनदीप कौर ने निभाई। सक्कलेंट वर्ग में जसलीन कौर व ओरनामेंटल वर्ग में याशिका द्वारा स्टार्टअप एचएमवी मिशन हरियाली लांच किया। यहां डॉ. नीलम शर्मा, डॉ. सीमा मरवाहा, डॉ. अंजना, डॉ. जतिंदर कुमार,

National Science Day Celebrations

Alumni Lecture Series by Botany Department

Science Awareness Campaign

Workshop on Preparation of Standard Solutions by Chemistry Department

Guest Lecture and Workshop on Green Chemistry Practices by Chemistry Department

दैनिक सवेरा
टाइम्स

एचएमवी के एनवायरनमैंट क्लब ने मनाई आर्गैनिक होली

सवेरा न्यूज/कुश

जालंधर, 7 मार्च : हंस राज महिला महाविद्यालय के एनवायरनमैंट क्लब की ओर से डी.बी.टी. स्टार स्कीम के अन्तर्गत प्राचार्या प्रो. डा. अजय सरीन की अध्यक्षता में आर्गैनिक होली का आयोजन किया गया। इस कार्यक्रम का उद्देश्य इको फ्रैंडली, हर्बल तथा स्किन सेफ रंगों के प्रयोग के प्रति जागरूकता पैदा करना था। इस अवसर पर इको-फ्रैंडली रंगोली तथा फायरलैस कुकिंग प्रतियोगिता का आयोजन किया गया। सभी स्ट्रीम्स की छात्राओं ने बढ़-चढ़कर इसमें भाग लिया। छात्राओंने इको-फ्रैंडली मैटीरियल जैसे दालों, चावल, आटा, पत्ते व फूलों से खूबसूरत रंगोली तैयार की। छात्राओं ने इम्यूनिटी बढ़ाने वाली वस्तुओं से रंग-बिरंगी डिश तैयार की। इनमें प्राकृतिक हर्ब्स, सिटरस फ्रूट, ब्रॉकली, बैल पेपर, अदरक, लहसुन, हल्दी आदि शामिल थे। छात्राओं ने चंदन, चुकंदर, हल्दी, पालक, हिबिसकस, गेंदा, चावल, आटा तथा बेसन से आर्गैनिक रंग भी तैयार किया। प्राचार्या प्रो. डा. अजय सरीन ने छात्राओं को कैमिकल रंगों की अपेक्षा आर्गैनिक व रंगों से होली खेलने के लिए प्रेरित किया। क्लब की इंचार्ज डा. साक्षी वर्मा ने बताया कि कैमिकल रंगों से हमारी त्वचा को भारी नुक्सान हो सकता है। प्रतियोगिताओं में निर्णायक गण की भूमिका डा. नीलम शर्मा, डा. श्वेता चौहान, दीपशिखा व डा. नीतिका कपूर ने निभाई। पहला, दूसरा व तीसरा स्थान पाने वाली टीमों को ई-सर्टीफिकेट प्रदान किए गए। इस अवसर पर क्लब के आफिस बियरर वशिका अरोड़ा, दिवंकल अग्रवाल, आकांक्षा ने कार्ड व बैज बनाए। इवेंट कन्वीनर रवि, डा. जतिंदर, सुमित, सुशील, रमनदीप, हरप्रीत, डॉ. सिम्मी व डॉ. शुचि भी उपस्थित थे। लैब सहायक सचिन ने सारे प्रबंध किए।

आर्गैनिक होली की गतिविधियों में हिस्सा लेते हुए स्टाफ। (संदीप)

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