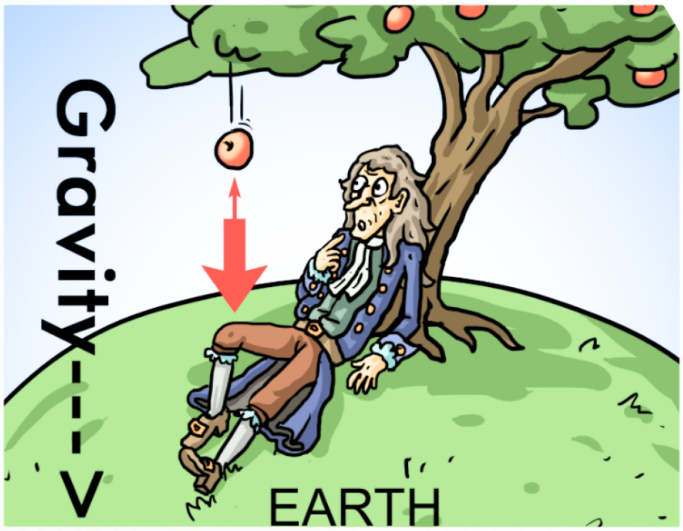
DEPARTMENT OF CHEMISTRY
SRI VENKATESWARA COLLEGE
UNIVERSITY OF DELHI

ABHIGYA

2022-23

Serendipity in Science

Serendipity is the beautiful phenomenon of coming across a fortunate event, purely based on chance. Many scientific discoveries, which have completely revolutionized the world did have an element of serendipity. It's true that serendipity and good fortune are often cited as key factors in many scientific breakthroughs. But look closer.



Even when scientists feel that they just got lucky — like Newton being hit on the head with his proverbial apple — the steps leading to a new finding or idea often tell a different story. It takes more than being at the right place and at the right time to make a serendipitous discovery. It needs a specialized background knowledge, an inquisitive mind, the right tools and indeed a creative mind to see the things in a new way.

Louis Pasteur

"In the field of observation, chance favours only the prepared mind."

ABHIGYA
2022-23

The Magazine Committee

Patron

Prof. C. Sheela Reddy

Convenor

Prof. Sharda Pasricha

Teachers

Dr. Shefali Shukla
(Co-Convenor, Technical)
Dr. Vinita Kapoor
(Co-Convenor, Designing)
Dr. Shikha Gulati
Dr. Pooja
Ms. Laishram Saya Devi
Dr. Ramavath Janraj Naik
Dr. Thoti Vasantha
Dr. Neelam Kumari
Dr. Meena Bisht

Students

Nihal Ojha (Designing Head), Ann Sunny (Technical Head), Anoushka Amar, Sahid Ansari, Lakshita Chhabra, Neha Negi, Dipankar Bagchi and Rhea Rawat.

TEACHERS EDITORIAL BOARD

Left to right:
Top row: Dr. Vinita Kapoor (Co-Convenor), Dr. Shefali Shukla (Co-Convenor), Prof. Sharda Pasricha (Convenor), Dr. Shikha Gulati, Dr. Pooja
Bottom Row: Dr. Ramavath Janraj Naik, Dr. Meena Bisht,
Dr. Thoti Vasantha, Ms. Laisharam Saya Devi, Dr. Neelam Kumari

STUDENTS EDITORIAL BOARD

Left to right:
Rhea Rawat, Ann Sunny (Technical Head), Sahid Ansari, Nihal Ojha (Designing Head), Dipankar Bagchi, Anoushka Amar, Lakshita Chhabra, Neha Negi

PRINCIPAL'S DESK

Education should be a blend of academic excellence and creativity. The students should be encouraged and empowered to grow as strong, reflective and humble individuals with discerning minds, completely prepared to make a mark in all spheres of life.

The Department of Chemistry, Sri Venkateswara College, has been known for providing students with opportunities to learn, explore and grow, through situations that challenge them to identify their strengths and reinforce them.

I am immensely delighted and filled with pride to announce the launch of this year's edition of "**Abhigya**", the Annual Magazine of the Department of Chemistry, highlighting upon the captivating theme **"Serendipity in Chemistry"**. Multiple historic discoveries provide us with evidence that serendipity has played a major role in several scientific researches, especially chemistry. It is no exaggeration to mention that it is in the classrooms and labs of our college that numerous leaders and innovative minds have flourished and taken shape with time. Freedom to work and express freely and without fear is what we learn from here. Initiatives like these go on a long way in opening up new doors of opportunities for the students and encourage their creative talents.

It is a real delight to witness the zeal and passion in the faculty as well as the students of the department in learning new skills and gain additional knowledge thereby inculcating the habit of thinking out of the box. I wish that this year's edition of **"Abhigya"** brings a lot of knowledge in terms of the research articles and creative science. I wholeheartedly appreciate the Teacher in Charge of the Department, the teaching and non-teaching staff, the editorial board and would like to congratulate the whole team for successfully bringing out this issue of the Magazine 2022-23. I wish you all success.

C. Sheela Reddy

Prof. C. Sheela Reddy

CONVENOR'S DESK

Education is not the learning of facts; it is rather the training of the mind to think.
- Albert Einstein

With immense pleasure I welcome you to this new edition of "**Abhigya**"- The Annual Chemistry Magazine of our college. Abhigya reflects the admiration for the subject, Chemistry by the department and its students. It is written with the collaborative efforts of our extremely talented students and personalized mentorship of our passionate teaching staff. It kindles the imagination of our learners and serves as a platform for our students to showcase their writing skills, creativity, and knowledge.
The theme of this year's magazine is **"Serendipity in Chemistry"**. Serendipity pronounces discoveries that occur at the intersection of wisdom and chance. Plenty of scientific discoveries till date are attributed to a stroke of luck or fate. Undoubtedly, good fortune and serendipity are frequently quoted as vital factors in scientific innovations but as we dig deeper on hearing that a scientist got lucky such as the famous incident of apple falling on Newton's head- the steps leading to any innovation or discovery often tell a different tale. This edition of Abhigya will describe several such stories and I am sure by the time you reach the end of this magazine, you will agree with me that it takes more than just mere luck, more than being at the right place, at the right time, to make a serendipitous discovery.
I express my sincere gratitude to our beloved principal, Prof. C. Sheela Reddy, for her unflinching support. I express my gratitude to all students and teachers of Chemistry department who contributed and helped us in bringing out this year's issue. I would also like to express my appreciation to my editorial team who worked ceaselessly to constitute this passionate piece.

Learning is not attained by chance; it must be sought for with ardour and attended to with diligence.

Prof. Sharda Pasricha

EDITOR'S NOTE

NIHAL OJHA
DESIGNING HEAD
B.SC. (H) CHEMISTRY II YEAR

ANN SUNNY
TECHNICAL HEAD
B.SC. (H) CHEMISTRY III YEAR

To achieve anything we need a mission, a vision, and a goal. The vision to create an admirable piece of media that would help everyone to cherish chemistry more, led to the creation of our departmental magazine. The start of any great creation is a well-designed draft and the first task of creating this magazine was to develop a well sought out layout. Once the layout was set, the next task was to call for articles to be included. The content was ready and then came in the need for the work by the editorial team and the creative efforts of our design team. All the sincere efforts of the respective contributors along with the immense support from our wonderful teachers, helped us to reach our goal.

As coming together is a start, keeping together is progress and working together is success, this magazine is a fruit of a well-planned team effort. It represents the passion, sincerity, respect, and admiration we have for the subject chemistry. From our dear friends who provided us with wonderful articles, the editorial team, the technical and creative teams under the guidance of our respected teachers, helmed this amazing creation. We present to you the annual departmental magazine **ABHIGYA** encompassing the theme **"SERENDIPITY IN CHEMISTRY"**.

Nihal Ojha
Ann Sunny

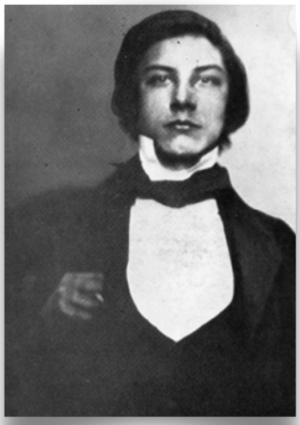
CONTENTS

A HAPPY ACCIDENT

SYNTHETIC DYESTUFF MAUVE

By: Riya Katiyar, B.Sc. (H) Chemistry, 2nd Year

We live in a colorful environment, and if the naturally occurring colors weren't enough, artificial colors can be created. This article simply explains how using an inquisitive mind might improves a person's life. William Henry Perkin, a British chemist, made the incredible accidental discovery of the first synthetic color when he was just 18 years old. Perkin worked on the synthesis of quinine, which is used to treat malaria, while he was a student of August Wilhelm von Hoffman.



William Henry Perkin

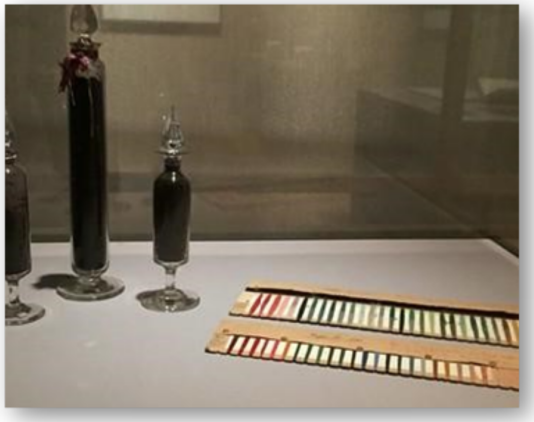
Quinine was produced artificially since it was previously only available from the bark of the cinchona tree, which was cultivated on plantations in Southeast Asia. Given that quinine's natural form was challenging to extract, Hofmann was interested in the chemical synthesis of natural substances and felt it would be a nice challenge.

It was Perkin's responsibility to conduct tests with a chemical known as aniline, which is an odourless aromatic oil made from coal tar. In his home laboratory, Henry Perkin worked on his assignment and ran an experiment using potassium dichromate to oxidise aniline. As a result, a black precipitate forms, and when the colour was taken out, it was a deep purple which resembles silk. Perkin named his own synthetic dye mauveine and noted his findings in a journal. He also named the colour mauve.

Perkin Mauve

Perkin's fingerprints in mauve can be seen on some pages of his laboratory notebook from the museum of City of London School.

This amazing discovery revolutionized the dyeing sector and paved the way for the contemporary chemical industry. After Perkin's innovative use of a coal tar derivative to create synthetic dyes, the substance stopped being a waste product and became useful for waterproofing fabric. Other coal tar derivatives were also used in the manufacture of saccharine, the pharmaceutical industry, and the creation of perfumes. Then, at the age of 36, Perkin was able to leave the corporate world and spend the remainder of his life conducting research in various branches of chemistry. The world's first synthetic dye, also known as mauveine or aniline purple, was one of the first chemical dyes that were mass-produced.



Mauveine samples and James Morton colours. Science Museum, The Art of Innovation exhibition

CIS-PLATIN

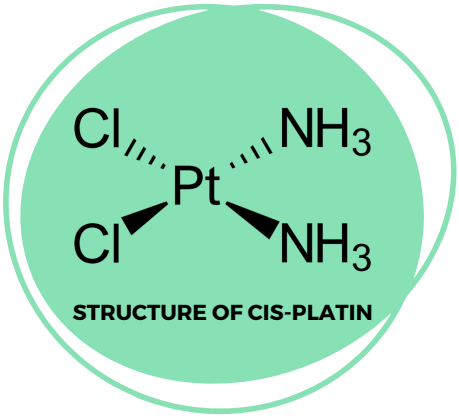
THE STORY OF A PLATINUM-SELLING LIFE-SAVER

Anoushka Amar B.Sc. (H) Chemistry 2nd Year

Discovery

Barnett Rosenberg, Ph.D., was following a hunch in the experiment that led to the discovery of cis-platin in 1965. A Michigan State University biophysics researcher, Dr. Rosenberg, noticed that microscopic images of dividing cells resembled the trend of iron shavings subjected to a magnetic field. He wondered if this meant that an electrical field could influence cell division, so he decided to put this theory to the test. Cis-platin was discovered "accidentally." Dr. Rosenberg, turned on the power after inserting platinum electrodes into a solution comprising of the bacteria E. coli. The bacterial cells stopped dividing as soon as the current was turned on, but they grew to up to 300 times their normal length. When the power was turned off, the bacterial cells began to divide once more.

The electrical field appeared to be controlling the cell division. Later, Dr. Rosenberg referred to this as the "accidental discovery that led to cis-platin." They believed they had discovered a method to control the growth of the cell via electrical currents. They spent two years trying to figure out the shown effect of the electrical field but then realized that it had no relation with electricity. Not the electric field, but a platinum compound released by the electrodes, was preventing cell division. Cis-platin was later given its name. Dr. Rosenberg then wondered if cis-platin could prevent the division of the cell in tumours.



STRUCTURE OF CIS-PLATIN

He and his colleagues discovered that it did indeed attack tumors when tested in a sarcoma mouse model. Even though cis-platin was extremely toxic, so much so that it can cause kidney damage at high doses, the mice were able to tolerate it at low doses. More importantly, the tumours shrank in response to cis-platin. Months later, the mice were still healthy.

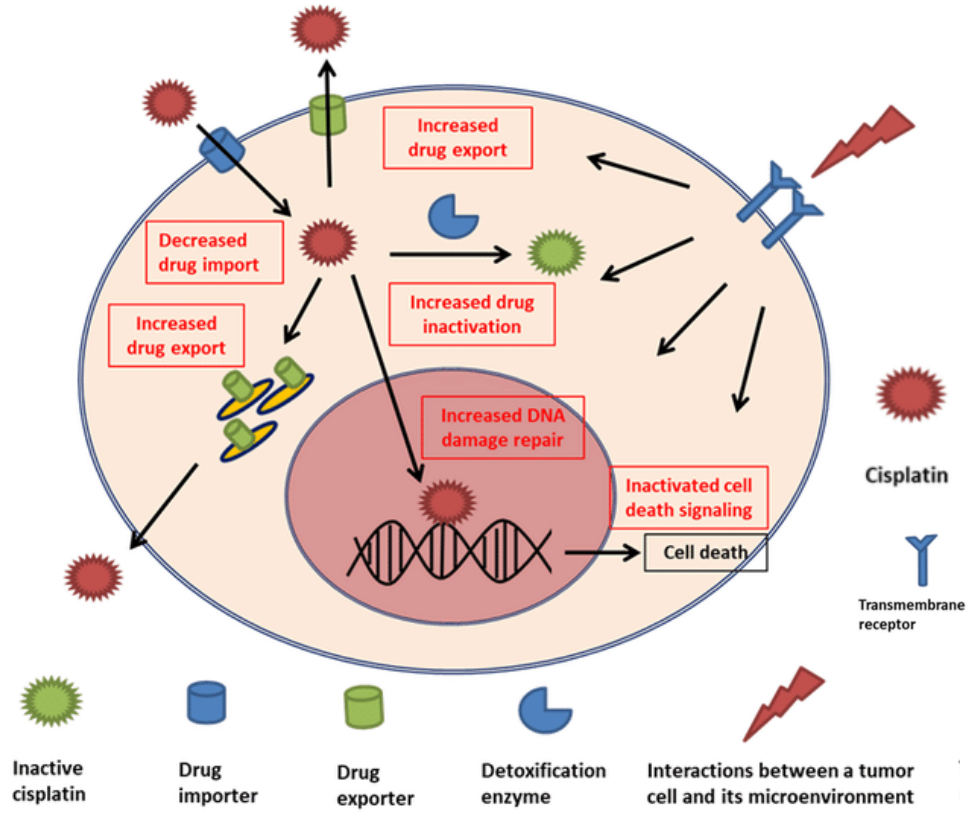
Mechanism of Cis-Platin-Induced Cytotoxicity

Platinum-based chemotherapy drugs can enter and exit cells via the transmembrane transportation system, in addition to the passive diffusion mechanism. The aquation reaction initiates cis-platin activity after it enters cells. Cis-platin aquation occurs spontaneously due to the low [Cl-] in the cytosol, resulting in the replacement of one or both Cl ligands with the H2O molecules. These cis-platin aquated forms are highly reactive with a variety of cytoplasmic substrates, including reduced glutathione and metallothionein proteins. Because of its nucleophilic nature, nuclear DNA is the most likely target to react with aquated cis-platin. Also, aquated cis-platin preferentially attacks the N7 position of the guanine base rather than other bases present in DNA. The interaction of cis-platin and DNA bases can produce a variety of DNA adducts.

All of these platinum-DNA adducts can be totally eradicated by the intimate cooperation of DNA repair systems in cells if only a small number of DNA damage lesions are formed. When the extent of cis-platin-induced DNA damage exceeds the capacity of repair, cell die, must commonly through activation of the apoptotic signaling pathway (Chen and Chang 2019). These cellular biology-based cytotoxic mechanisms of cis-platin underpin the research map of tumour resistance to this platinum-based drug.

Conventional Perspectives on Cis-Platin Resistance from a Tumour Cell

As the formation of platinum-DNA adducts is the primary mechanism of cis-platin cytotoxicity, cellular reactions that reduce this type of DNA damage are important in the development of resistance to this metal drug. According to the most widely accepted theories, three intracellular adaptation mechanisms are mainly responsible for the growth of cisplatin resistance. Changes in cellular accumulation of the drug, intracellular detoxification of the drug, and DNA damage repair are the responsible mechanisms, as summarized in figure



The diagram depicts intracellular mechanisms that influence the development of cis-platin resistance and have clinical implications(Chen and Chang 2019).

Did you know?

Cathode ray experiments were widely conducted by scientists at the end of the nineteenth century. A piece of paper that was covered in barium platinocyanide was held by Roentgen in space. As the device was turned on, Roentgen detected a glow on the paper. As a result, Röentgen discovered X-rays.

TEFLON
AN INVENTION THAT STICKS

Rhea Rawat B. Sc. (H) Chemistry, 2nd Year

"On another occasion, at Jackson Laboratory, across the Delaware River in New Jersey where I worked, I noticed an unusual commotion in the laboratory of Roy Plunkett, which was across the hall from my own. I investigated and witnessed the sawing open of a cylinder from which the first sample of Teflon an extremely useful fluoropolymer." These words were said by a young chemist Charlie Pederson in 1987 while delivering his noble lecture on the invention of the crown ether compounds.

The present era is a time of rapid industrial and technical development where polymers are an integral part. Polymers are used today in every single device that man uses to lead a simple life. In order to address the expanding demands of new technologies and population expansion, scientists were eager to discover new materials. Herman Mark, Karl Meyer, and Herman Staudinger established the fundamental ideas of polymer science following hours of heated debates over many theories.

The history of fluoropolymers' development is an intriguing concoction of genius and chance. The serendipitous discovery of Teflon by Dr. Roy Plunkett is the subject of the tale. Roy began working for DuPont in 1936 at the Jackson Laboratory in Deepwater, New Jersey, along the Delaware River. He was attempting to work on the Freon family of fluorocarbons. Additionally, he was also working on creating new fluorinated refrigerants that were not only safer than the old gases but also fully odourless, colourless, non-flammable, and non-toxic.

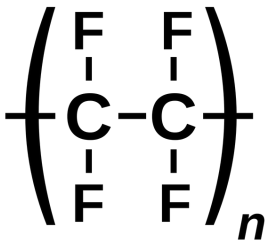
Depiction of the discovery of PTFE by Roy Plunkett and his assitant, Jack Rebok.

Tetrafluoroethylene (TFE) and hydrochloric acid (HCl) were combined by Plunkett early on April 6, 1986, to create the refrigerant CClF -CHF . He checked the pressure readings on a full cylinder of TFE and discovered that there was no pressure. To his surprise, the cylinder's weight was also the same as the day before. Plunkett and his technician noticed a small amount of a slick, white liquid after cutting open the gas the instant they removed the valve and turned the cylinder upside down. When the waxy powder was examined, it was discovered to be polytetrafluoroethylene (PTFE), which the DuPont Company later trademarked as "Teflon."

Initially, Roy's newly found polymer wasn't very practical because it had a very low melting point of 340˚C and a very high viscosity after melting. The mere question of whether anyone would ever find a suitable use for it remained unanswered, but soon the Wartime requirements saved Roy Plunkett's invention from oblivion. In order to build an atomic bomb to destroy Nazi Germany, a covert project known as the Manhattan Project was started. Lieutenant General Leslie Richard made important choices regarding how to prioritize the various isotope separation techniques. For the uranium enrichment procedure in which differential UF6 diffusion was to be used to separate U-235 from U-238, his project required a non-corrosive material. After extensive testing and investigation, the U.S. Patent Office decided to place PTFE under a "Secrecy Order" because its properties like excellent thermal stability, flame resistance, and electrical properties met the needs of researchers trying to create substances with a comparable chemical makeup.

Roy Plunkett gained attention for his amazing finding in the 1950s and 1960s. At its 25th anniversary, DuPont staged a sizable party in honour of the discovery of PTFE which was later trademarked as Teflon. Today Fluoropolymers are a crucial component of humankind's scientific breakthroughs.

From windshield wipers, furniture and clothing, lightbulbs, glass coatings, hair products, and non-stick pans to having diverse applications in the medical sphere like surgeries and usage as a coating on catheters (it keeps bacteria and other infectious agents off the surfaces), Teflon is used everywhere. Since the past few years, this sticky powder has indeed become the backbone of the majority of plastic industrial units across the entire globe.



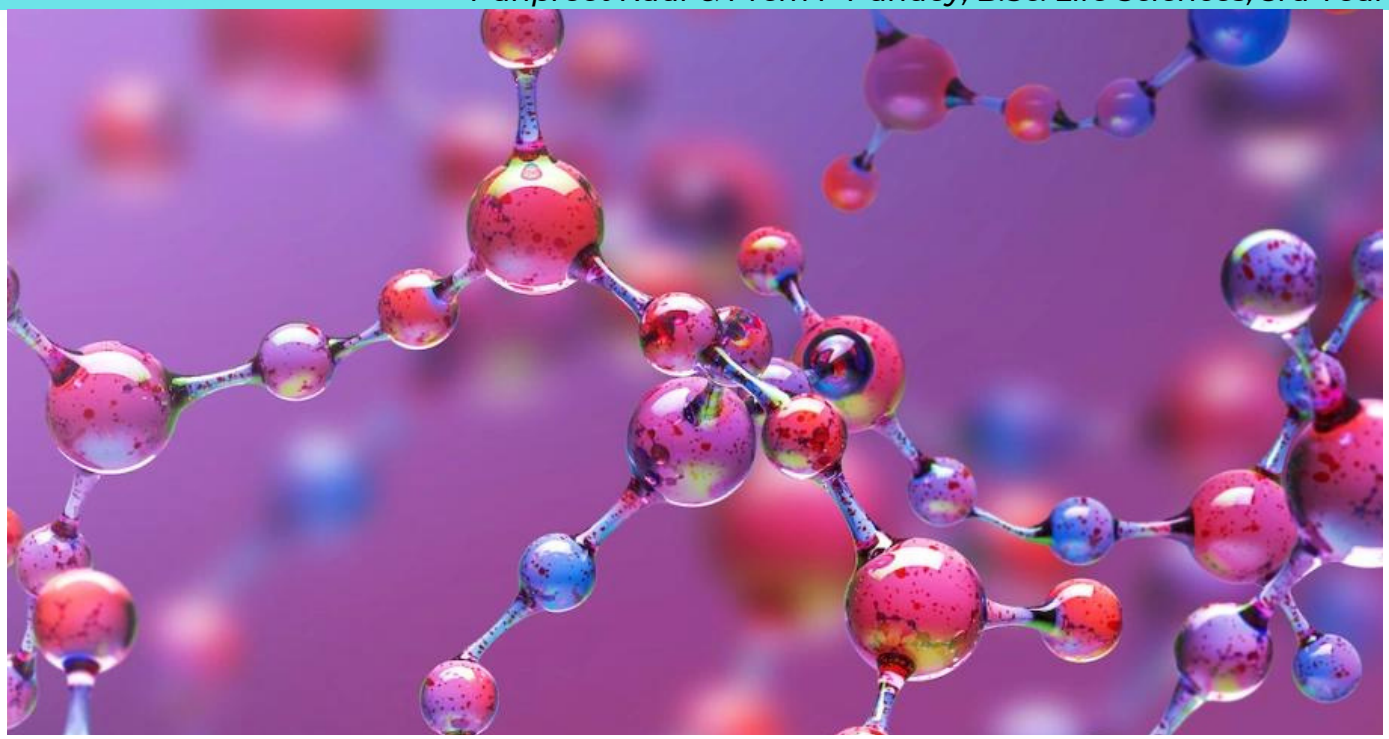
Did you know?

German chemist C.P. Schonbein had been conducting chemical experiments in his Basel, Switzerland, home in 1845. He unintentionally dropped part of the sulfuric and nitric acid mixture onto the kitchen table. He quickly wiped it off with his wife's cotton apron, which was nearby. The apron was then placed over the cooker to dry. Afterwards, he discovered that the apron had not only dried, but had also mysteriously vanished. He came to the conclusion that the interaction between the nitric acid combination and the cellulose found on the apron had resulted in the production of fresh explosive nitrocellulose.

ORGANOCATALYSIS

AN APPROACH TOWARDS GREENER TOMORROW

Paripreet Kaur & Prem P Pandey, B.Sc. Life Sciences, 3rd Year



Change was coming- as green organic molecules, sustainably obtained from renewable sources, catalyse challenging carbon–carbon bond forming transformations with exceptionally high enantioselectivities. Organocatalysts, with incredible reactivity that are rationally designed and enable unprecedented reactions, challenge the efficiency of the transition metal catalysts and enzymes.

Few years ago, nobody had the idea how selective catalysis could be done. It was thought to be synonymous with transition metal and enzyme catalysis. However, the discovery of organocatalysis by David MacMillan and Benjamin List caused a revolution and dominated many areas in asymmetric synthesis. This development dispelled the idea that metals and enzymes are the only catalysts for chemical reactions and ignited the astounding flourishment of the field in the decade that followed. These catalysts are easy to handle, less toxic and also help in minimizing waste. Asymmetric organocatalysis, hence, turned out to be an environment friendly method that accelerates chemical reactions and helps in creation of specific types of molecules.

MacMillan, when completed his postdoctoral studies at Harvard, grew tired of spending his day working with air and moisture sensitive transition metal catalysts. He already, at that time, dreamt to find a simple catalyst for organic molecules. With already a plan in his mind to design a molecule that can reserve and reposition electrons, in same way as a metal centre acquires and donates charge in a traditional catalytic cycle, he had no idea how to do it! After many failed attempts, the eureka moment happened when one of his students asked him a question about the mechanism for a reductive amination reaction.

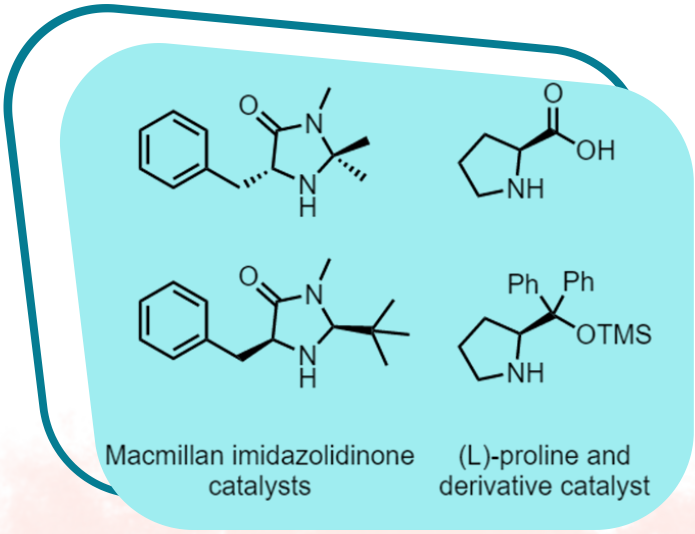
He found that the reaction scheme between alpha, beta-unsaturated aldehydes and cyclopentadiene could work as an organocatalytic reaction.

List on the other hand, at the same time, was working on his PhD research. In his postdoctoral studies, he worked with X-ray diffraction scientists and examined aldolase antibodies. He found that enzyme's active site was an amino group and an acid group that are a crucial part of its reactivity. He also had a similar vison like MacMillan and wanted to work with small organic molecules that could catalyse aldol reactions. He, for that, designed and sketched small molecules that have an amino as well as an acid group. He did an independent experiment, proline-catalysed aldol reaction of acetone with para-nitrobenzaldehyde. The proline's chirality was able to impart enantioselectivity on the reaction, by influencing the direction from which the aldehyde approached.

They both took a similar approach with different molecules and made catalysts which were modified to improve selectivity. MacMillan's and List's catalysts were both cheap and easy to handle. Within that decade the number of papers published in organocatalysis reached to about 1000 in a year. Both the scientist applied their chemistry to various reactions, such as three-component reactions and catalytic cascades. This was soon employed in various fields and was particularly exploited by pharma companies to construct complex bioactive molecules. For this breakthrough, MacMillan and List both shared a Nobel Prize awarded to them in the year 2021.

The hoopla around asymmetric organocatalysis is justified. Until approximately the year 2000, metals (particularly heavy metals) and enzymes were included in the broader category of catalysts. Both categories have their own set of constraints. Heavier metals were more expensive and harmful to the environment. They also leave traces in the systems where they act as catalysts, which is unacceptable for things that require a high degree of purity, such as medications and pharmaceuticals. Organocatalysis comes to the rescue as a new potent weapon that can efficiently catalyse a reaction without the usage of heavy metals, taking a step towards green chemistry and presenting itself as an advocate for sustainable development, ushering us into a greener tomorrow.

Because of the current emphasis on environmental protection techniques, it is critical to establish green chemistry paths to existing commercially relevant processes. Natural resources are rapidly decreasing and man has been obliged to recycle and reuse materials. Because of the mild reaction conditions and eco-friendly solvents that can be utilized in organocatalysis, it is regarded as a significant advancement in green chemistry. In organocatalysis, green solvents like water and supercritical carbon dioxide can be employed. If organocatalysts can be recycled, they become a significant tool in green chemistry and cost-effective processes.



The immobilized catalysts can be simply recycled and reused multiple times without losing efficiency. Because of the concern for establishing greener protocols for the synthesis of fine chemicals and pharmaceuticals, reusing catalysts is becoming a significant method. Thus, the immobilization of organocatalysts has emerged as the most important strategy for linking organocatalysis breakthroughs with green chemistry, which is expected to lead to the creation of simple, cost-effective effective, and environmentally friendly chemical processes in the future. Organic reactions are often multi-step reactions, with each step producing a byproduct that gradually strains the environment. When a reaction occurs in fewer steps, it is a more sustainable choice, and organocatalysis finds its utility there. One such place where it finds its utility is antiviral production where developments in asymmetric synthesis have led to the production of antivirals based on green methods.

Many serious human diseases are caused by viral infections, which have a relatively high fatality rate. In this regard, both academia and the pharmaceutical industry are always looking for novel molecules having antiviral activity, while also attempting to develop greener and more efficient methods of synthesizing these compounds. Asymmetric organocatalysis provides one-pot reactions for antiviral synthesis, reducing waste generation from purification processes and paving the route for greener chemical reaction scale-up.

Did you know?

Scientists were shocked to learn that summer lightning over the United States has dramatically increased the regional ozone level and other chemicals in the air, impacted the atmospheric chemistry from 3 to 8 miles above the surface of the Earth, and changed the weather. After conducting additional research, they came to the conclusion that the amounts of ozone and nitrogen oxides produced by lightning in that level of the atmosphere were greater than those produced by human activity. Summer thunderstorms over the United States have significantly boosted local pollution levels.

As lightning strikes, it heats the air, causing the bonds between the atoms to be broken. When the air cools, most of the atoms couple back up, but some also rearrange themselves. Ozone is created when some of the O atoms mix with O2 to form O3. This ozone gas is created and has a particular fragrance that is detectable immediately following a lightning strike. It smells somewhat like chlorine.

TRANSPARENT WOOD:
A WONDER MATERIAL AND WINDOW FOR FUTURE

Bikaramjeet Kaur, B.Sc. (H) Chemistry, 2nd Year

Is it possible that to look though trees or tree products instead of transparent glass panes to ensure a green future? The answer is "YES" and is happening currently. It is made possible with the advent of a new version of cellulose known as "TRANSPARERENT WOOD" which is a result of exploration of new horizons for cellulose nanotechnology.

Cellulose is the part and parcel derivative of wood, which characterizes its mechanical performance. Native wood is non-transparent, and has distinctive color because of the cellulose, hemicellulose and lignin.

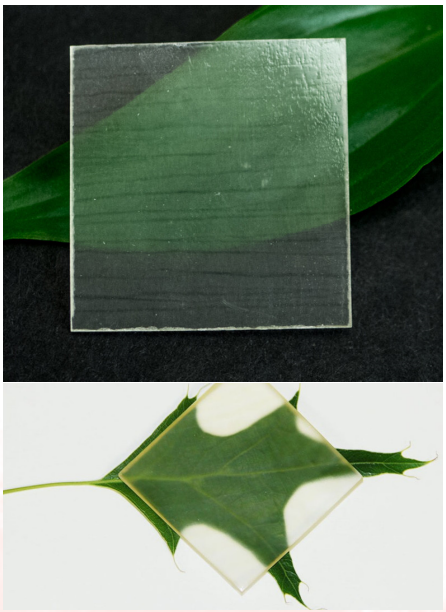
Preparation of transparent wood stems from delignification process, followed by infiltration of the polymer with refractive index matching the wood substrate. A wood sample is drenched in 5% aqueous solution of hypochlorite ($NaClO_2$) or sodium hydroxide and sodium sulphite solution followed by immersion in hydrogen peroxide.

Promising optical and mechanical properties:

The reported transparent wood indicates high optimal transmittance and high haze. The light interaction with transparent wood results to reflection at the interface, Scattering and Absorption inside the transparent wood. Scattering is possible because the polymers with different refractive Indices were used for fabrication and this happens at the interface between wood tissue and polymer.

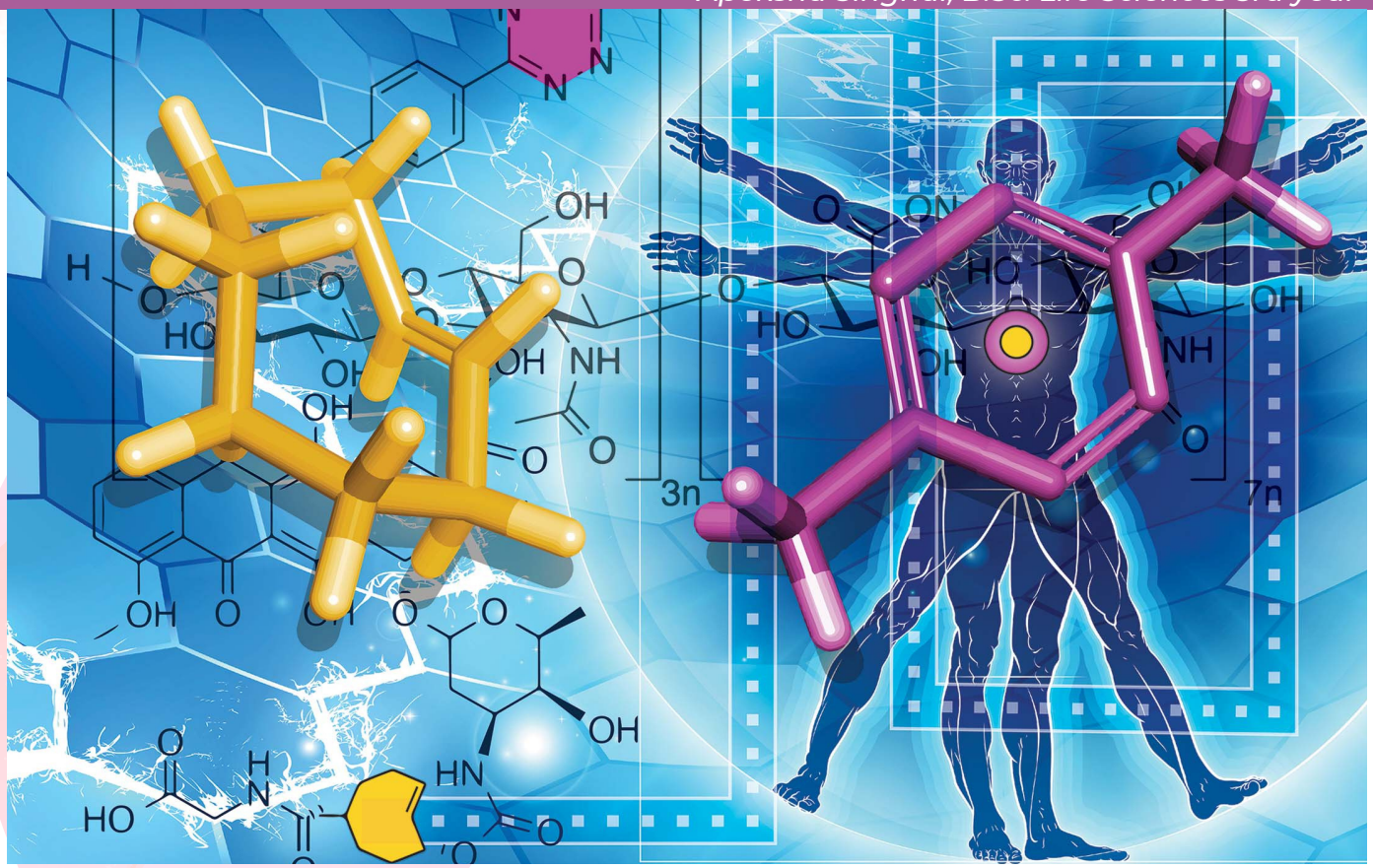
Can glass be replaced by Transparent Wood?

Even though glass is most commonly used for window construction and other purposes, it comes with a huge cost economically as well as ecologically. Transparent wood shows low density, high optical transmittance and haze, good mechanical performance, and potential for multi-functional modifications. Optically transparent wood is an excellent candidate for lightweight and low-cost structures in light-transmitting buildings. One of the major advantages of transparent wood in terms of its structural applications is its ductility and resistance to fracture, lower thermal conductivity, better impact strength and lower density as compared to glass. Switching to transparent wood could really prove to be cost effective. It is approximately five times more thermally efficient than glass, cutting energy costs.



CLICK ACTIVATED DRUGS IN FIGHT AGAINST CANCER

Apeksha Singhal, B.Sc. Life Sciences 3rd year

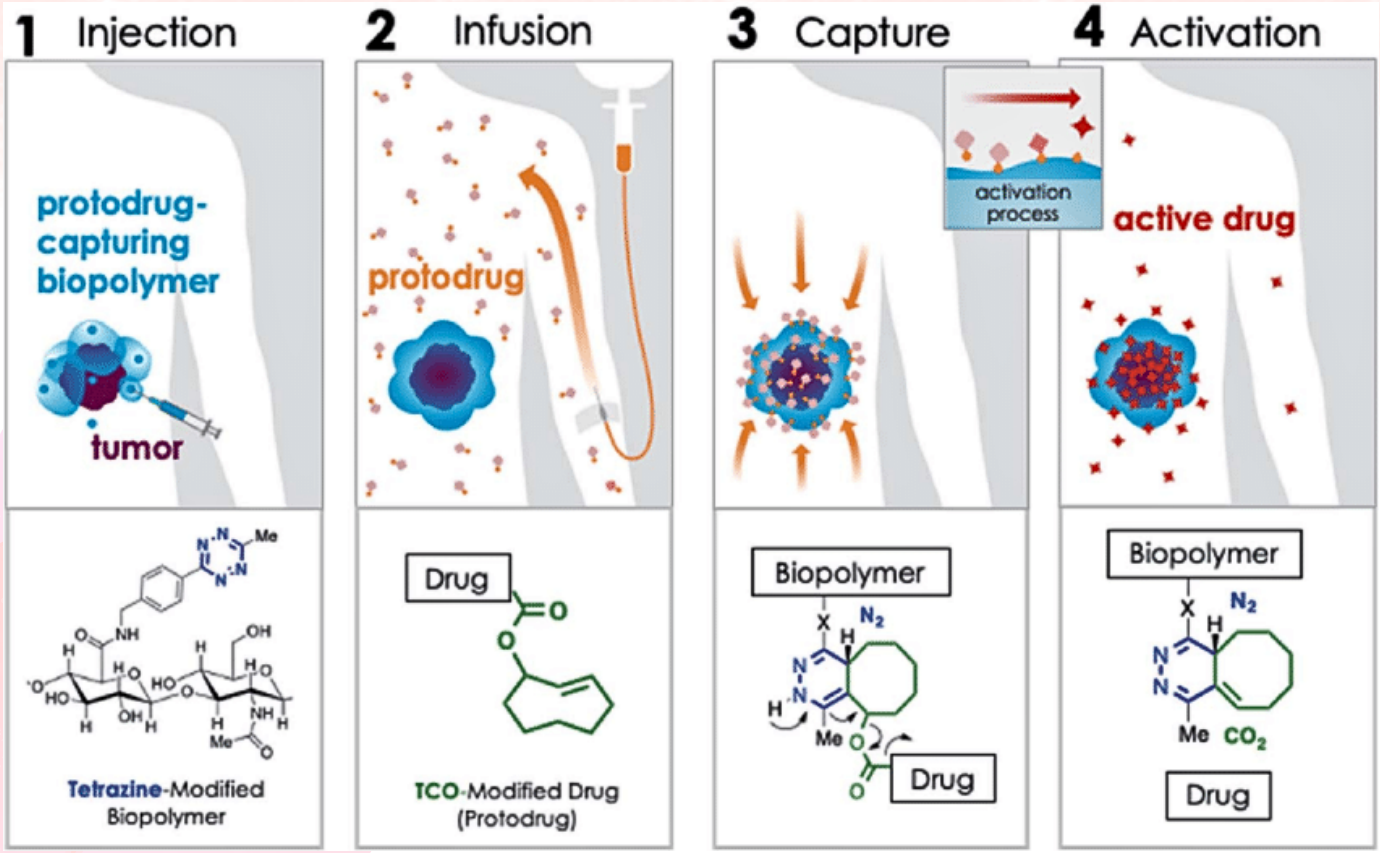


Life on earth requires the construction of carbon–carbon bonds in an aqueous environment. Nature's main mechanism for forming C–C bonds is carbonyl (aldol) chemistry. Following nature's example, it is attempted to develop substances by combining tiny units with heteroatom linkages (CXC). The objective is to create a growing library of strong, selective, and modular "blocks" that function dependably in both small- and large-scale applications; this approach is named 'click chemistry'.

It is a class of biocompatible small-molecule reactions usually used in bioconjugation and a range of reaction conditions that help accelerate specific reactions between functional groups that are in close proximity. Click chemistry directly allows to construct complex natural or unnatural bioactive molecules with ease, have high yields and calls for little to no purification. Cycloadditions, Nucleophilic ring-openings, Non-aldol carbonyl chemistry, Additions to carbon-carbon multiple bonds are the four main categories for click reactions. It has found use in a wide range of scientific fields, such as pharmaceutical sciences, polymer chemistry, and materials sciences.

Carolyn R. Bertozzi, Morten Meldal and K. Barry Sharpless, who developed this new way to join molecules together won this year's Nobel Prize in Chemistry. These types of bioorthogonal 'click' reactions are now a mainstay of drug0 discovery research and increasingly used to create the next generation of cancer therapeutics and diagnostics.

In tests, the complexes were found to have remarkable pharmaceutical properties, including the ability to stop cancer from spreading, increased potency, and selectivity for cancerous cells over non-cancerous cells, which was significantly better than conventional chemotherapy drugs like cisplatin.



High tumor specificity with minimal side effects is a goal of targeted cancer treatments. The Click Activated Protodrugs Against Cancer (CAPAC) platform is developed, which enables the targeted activation of drugs at a specific site in the body —a tumor—to fill this unmet need. In contrast to antibodies (mAbs, ADCs, and other targeted approaches), the mechanism of action is based on in-vivo click chemistry and does not depend on factors like enzymatic activity, pH, or oxygen levels or the expression of tumor biomarkers. One or more doses of a trans-cyclooctene (TCO)-modified cytotoxic protodrug with attenuated activity are administered systemically following an injection of a tetrazine-modified sodium hyaluronate-based biopolymer into a tumor site. Through an inverse electron-demand Diels-Alder reaction between tetrazine and TCO, the protodrug is locally captured by the biopolymer. It then converts to the active drug directly at the tumor site, overcoming the systemic limitations of conventional chemotherapy and the requirement for specific biomarkers in traditional targeted therapies.High modularity of click chemistry helps to accelerate the current drug discovery process, which relies on massive screening of chemical libraries. This modality can be used before and after surgery and is especially beneficial for patients who have lesions that are ineligible for surgery.

Did you know?

Copper and some other metals like zinc, nickel, and titanium have antibacterial properties which are used in designing nanoparticle drug delivery systems.

ASPARTAME
AN ARTIFICIAL SWEETENER

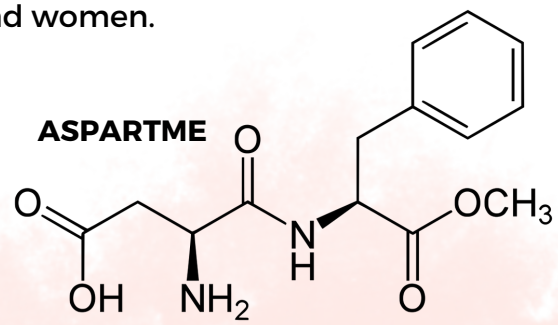
Yuvraj Harit and Sahil Gothwal, B.Sc. (H) Chemistry 2nd Year

James M. Schlatter invented the artificial sweetener 'Aspartame'.

During the deadliest world wars, artificial sweeteners also known as non-nutrient sweeteners came into the picture in order to meet the lowered sugar production caused due to extreme agricultural crisis. Saccharin was the very first artificial sweetener that was accepted as an alternative to sugar. It was discovered accidentally by Remsen and Fahlberg in 1879 when Fahlberg started eating his dinner bread without washing his hands after working a whole day in the lab; heobserved that the bread tasted very sweet. At the beginning of the 1950s, many studies were carried out which stated that replacing sugar with Artificial sweeteners was desirable to reduce the calorific value of manyfood products.Amongst the increasing demands for dietary productssaccharin gradually lost popularity because of its bitter aftertaste. The need for discovering an Artificial sweetener with a new improved taste was very important.

In 1965 James M. Schlatter invented another artificial sweetener 'Aspartame'. The discovery of the sweetening properties of Aspartame is related to an interesting mixture of brilliance and serendipity. Schlatter was working with a company G.D Searle. He was inventing new drugs that could treat stomach ulcers efficiently. His study revolved around chemicals consisting of four amino acids. Initially,he joined aspartic acid and phenylalanine (two amino acids) together which resulted in the formation of aspartyl-phenylalanine-1-methyl ester. While performing the experiment some amount of this product got spilled over the fingers of his right hand. Before picking up a paper to clean it off his fingers accidentally he licked one of his fingers, to his surprise the substance that he invented was immensely sweet in taste. Eventually, he realized the main cause of the sweet taste was because of the formation of aspartyl-phenylalanine-1-methyl ester. Later as further research was carried out on this chemical substance it popularly emerged to be known as Aspartame. After the initial obstacle to the legalization of this substance as a food additive, the usefulness of aspartame as a sweetener was enhanced after various research work was carried out on these substances. Many theories concluded by stating that aspartame could be used as an artificial sweetener since it is about 200 times sweeter than sugar, while its calorific value, at the concentrations giving the impression of sweetness, is almost zero which could prove to be healthy for a human body and help them fight through obesity. In the present times, Aspartame has become one of the most important key sweeteners all across North America, Europe, and Asia. It is being marketed under the name of NutraSweet in USA.the use of aspartame as an everyday tabletop sweetener has blossomed across the entire globe. It has become a delicacy to serve a hot beverage such as coffee or tea in a restaurant with both sugar and NutraSweet. Furthermore, the use of aspartame a non-calorie sweetener has moved from a female-onlyhabit to one treasured by both health-conscious men and women.

ASPARTME



PASTEUR AND CHIRALITY
A TALE OF SERENDIPITY

Dipankar Bagchi, B.Sc. (H) Chemistry 2nd Year

Louis Pasteur

We imagine mirror images as our alternate existences in the Universe. Then a beautiful reality outsmarts our imagination, as we realise that mirror images do exist, in molecules, which lay the foundation for chirality

Molecular chirality or molecular dysymmetry at the most basic level, occurs when the molecule can occur in two forms that are non- superimposable mirror images of each other which are defined contemporarily as enantiomers. These enantiomers differ in optical and biological activity. The discovery of chirality in molecules is a result of the blend of serendipity combined with Pasteur's sharp discerning ability

Louis Pasteur, known as founder of molecular chirality and the father of microbiology was a French scientist and a great lithographic artist. Legend has it that around 1820, Phillippe Kestner was refining a potassium salt of tartaric acid from vinification and accidentally produced a mysterious acid, named as paratartarate acid or racemic acid. It was observed that the acid was optically inactive in aqueous and alcohol solutions. Eilhard Mitscherlich, a German chemist and crystallographer studied these double sodium and ammonium tartrate salts and concluded that both the paratartrate and double sodium-ammonium tartarate salt crystals, grown from optically active and inactive tartrates, were identical although they did not interact similarly with linearly polarized light in solution. When Pasteur studied this concept, he wondered:

Why do two apparently identical chemicals (double sodium-ammonium tartrate and paratartrate) have a different effect on polarized light?

Provision of this racemic acid by Kestner gave Pasteur the opportunity to carefully analyse the acid's chemical and optical properties. In 1848 Louis Pasteur, a young Agrégé Préparateur at Ecole Normale Supérieure in Paris was observing crystals of the double sodium-ammonium salt of tartaric acid under a microscope. He started to compare their crystalline forms, with this preconceived idea he would find racemism in the tartrate salts and not in the paratartarate. But to his surprise, he observed that paratartarate crystallised spontaneously from the solution to form conglomerate crystals .The two types of dissymmetric hemihedral crystals formed could not be superimposed and were in relation to each other as what a mirror image is to the real object. Further, Pasteur dexterously separated the two hemihedral crystals (one had a facet to the right and the other to its left) with a pair of tweezers.

This was the first demonstration of manual chiral resolution. When he used the polarization apparatus of Mr Biot, he observed the right. hemihedral deviated the light towards the right and the same happened for the left hemihedral crystal. If a 1:1 weight by weight amount of these crystals were mixed, they formed a racemic mixture that was neutral to the effects of polarised light. It was at this moment, on an early morning in 1848 that Pascal had demonstrated that the paratartrate is not a pure compound but a 1:1 combination of two enantiomers in a racemic mixture. His discovery was reproduced with Biot's concept of optical activity of dysymmetric compounds which made Mr Biot exclaim as he responded to Pasteur's discovery:

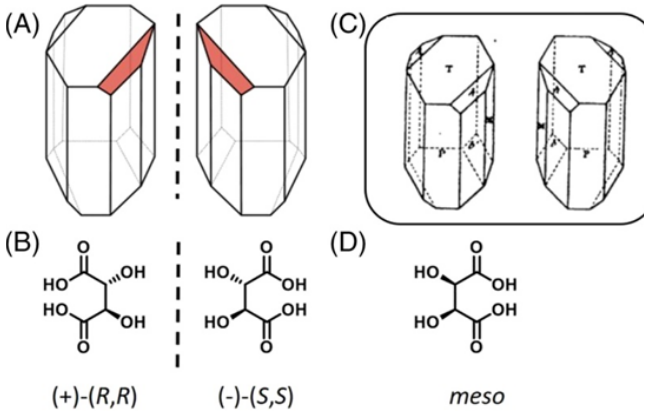


Figure: The hemihedral conglomerates depicting mirror image relationship

Mon cher enfant, j'ai tant aimé les sciences dans ma vie que cela me fait battre le cœur" ("My dear boy, I have loved science so much during my life, that this touches my very heart")

Thereafter Pasteur continued with his work on chirality and achieved great contributions to stereochemistry such as the phenomenon ofdiastereomism, chiral resolution via fractional crystallisation of diasteromeric salts, existence of meso-tartaric acid, fermentation of tartaric acid using living systems as an enantiomeric resolution process andfinally, enantioselectivity in the metabolism of tartaric acid by Penicillium glaucum, a common mold. His studies on enantioselectivity laid the foundation for microbiology and stereoselective drug chemistry as a cure for various prominent illnesses like rabies and polio prevalent at that time. Pasteur's discovery is a result of many unknown conditions lining up together, mostly accidentally. Firstly, the hemihedry and the spontaneous resolution only happens for 10% of racemic mixtures and Pasteur seemed to unknowingly experiment with one of them, the sodium-ammonium salts of tartaric acid.

Secondly, Pasteur used his great observational skills to discern that the experiment must be conducted in the morning since the temperature during the day may make the crystals redissolve. Later, his hypothesis proved to be right as the conglomerate crystals dehydrate at 28˚C. to form a racemate. It was also because Louis Pasteur was a trained lithographic artist that made him familiar with mirror images which led him to make such a sharp observation about molecular chirality. In lithography, the final image on paper is the mirror image of the original drawing on a limestone stone and to improve the quality of his drawings, Pasteur made them by looking at their image in the mirror. These facts combined with the fact that Pasteur was of just 25 years of age when he discovered molecular chirality among tartarates, a class of compounds meticulously studied by scientists at that time make his discovery seem unreal and beautiful. To this day, the hemihedral crystals separated manually by Pasteur remain hidden in secret somewhere in Paris. They are physical evidence to the fact that **serendipity often favours curious minds.**

AN INSIDE STORY ON LCDs

Lakshita Chhabra, B.Sc. (H) Chemistry, 2nd Year

In the nineteenth century, an Austrian botanist gave the LCDs an odd beginning. The evolution of the LCD went from early achievements like the pocket calculator to the significant turning point of a flat panel television display that can be hung on a wall, despite the LCD's unique and shaky beginning.

What are liquid crystals?

Liquid crystals are materials that have at least one additional phase between the solid and the liquid phase. This phase is called the liquid crystalline phase (which includes both the liquid and the crystalline phase). It has typical properties which lie between those of solids and liquids like **(a)** it flows like a liquid, or more fundamental, there is no long-range order in at least one of the directions, and (b) it is anisotropic, which is a property of crystals, or, again, more fundamental, there exists a long-range order in at least one of the directions. Hence, the name liquid crystal is given to the material, which exhibits at least one liquid crystalline phase.

Friedrich Reinitzer, an Austrian botanist**,** was the first one who came across a peculiar substance that showed a mesophase between the solid and liquid states. It liquefied at around 145 degrees Celsius, most likely turning white and sticky. It became isotropic and transparent when he raised the temperature to 179 degrees Celsius.

1936 - 2014

HEILMEIER

Heilmeier discovered a very effective technique for electronically controlling light reflection.

The new mode is highly appealing for uses like alphanumeric indicators due to its rise time of 1–5 ms and decay period of under 30 ms, as well as DC operating voltages in the 10-100 V range. With the efficiency of 45% of normal white, he was able to show reflective contrast ratios of more than 15 to 1. He called this phenomenon **DSM**, and using it as his foundation, he created the first functional liquid crystal display. And presto! The LCD was created!

Heilmeier, who is credited with developing the LCD or liquid crystal display, was inducted into the **National Inventors Hall of Fame.**

He found something called cholesteryl benzoate. On March 14, 1889, he sent a letter about it yo Otto Lehmann, a physics professor at the Technical University of Karlsruhe in Germany. He described the two melting points in precise detail in the letter. Lehmann thoroughly investigated the substance and reported that the liquid in the mesophase exhibited a double refraction effect.

Serendipity and Luck may have played a role in the discovery of liquid crystals and the development of liquid crystal displays. The history of the invention's scientific discovery,

commercialization, and scientific debate are all intertwined in this narrative. Early in the 20th century, these liquid crystals were unpopular amongst scholars and researchers In fact, the substance remained a source of scientific intrigue for nearly 80 years. Nobody was encouraged to use liquid crystals with specific physical qualities in a commercial entity and they subsequently remained a mystery to the average person. **Richard Williams**, who was employed at RCA Laboratories in Princeton, NewJersey, and who had previously discovered current-induced light scattering in negative dielectric anisotropic liquid crystal films, submitted the very first liquid crystal display patent in 1962. At the RCA Laboratories, **George Heilmeier** and **Louis Zanoni** continued similar research, introducing patterned transparent electrodes and developing active scattering LCDs in 1968. After putting a lot of effort into the Williams domain, Heilmeier proposed the **guest-host mode**. With voltages that were significantly lower than those of CRTs—less than 10 V for liquid crystal dye mixture versus more than 1000 V for CRTs—the device was able to transition colours while drawing only a little amount of electricity, **less than a microwatt of power per square centimetre!** The fall of 1964 saw a demonstration of this. Heilmeier predicted that wall-sized flat-panel colour television was just around the corner. The realisation of his idea, however, took nearly 25 years. Several display manufacturers still are employing LCDs, but they are adopting novel chemistry to get an advantage. **Quantum dots** are adaptable **light-emitting nanostructures** that have been used by certain businesses to enhance LCD colour quality and power efficiency These substances make use of the optical effects that result from the nanoscale fabrication of semiconductors.

Fig 1- Glass substrate on which system panel of LCDs is formed

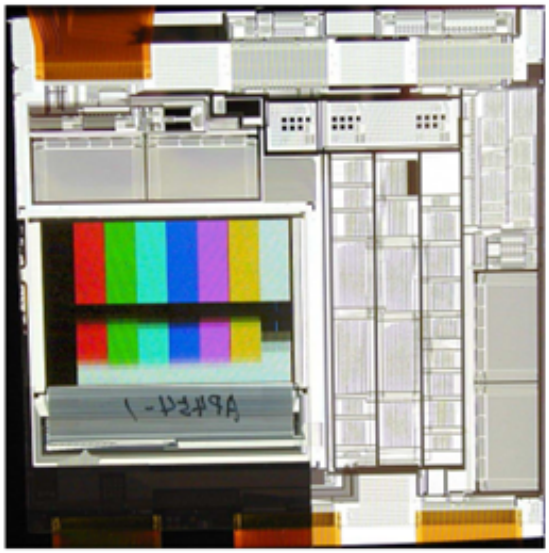
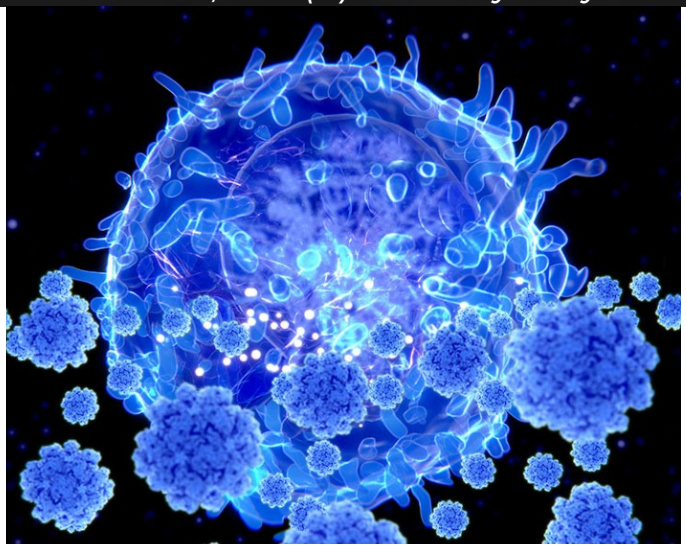


Fig 2- System panel under operation

When a substance like cadmium selenide is contained in a nanoscale sphere, the wavelength of light it emits is associated with the size of the sphere, making it simple to adjust the substance's optical properties Numerous businesses are developing **quantum-dot amplifiers** that can be coupled with a blue LED backlight. Some use **polymer films** with **nanocrystals** implanted, while others use liquid quantum-dot suspensions placed next to the LED. In both instances, the quantum dots transform a portion of the blue light into a combination of red and green, allowing less light to flow through the LCD colour filters without being blocked.

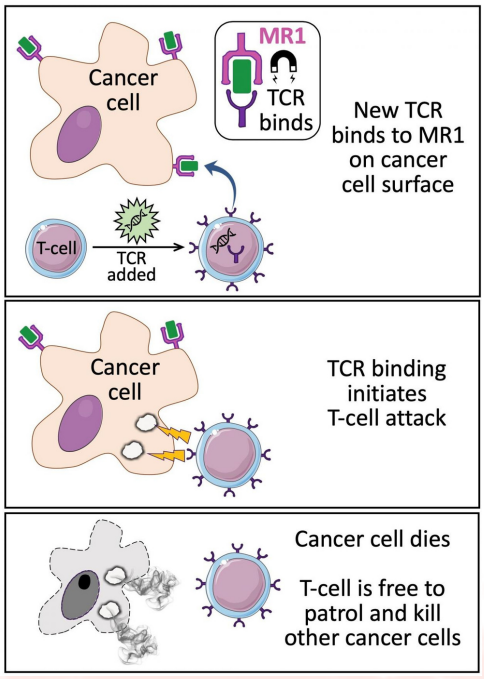
DISCOVERY OF T- CELL

Rose Chaudhuri, B.Sc. (H) Chemistry 2nd year



Marking a breakthrough in cancer treatment, a new type of immune cell that kills most cancers was discovered by researchers at Cardiff University's School of Medicine. The discovery of T Cells was found highly unusual and this discovery could further be helpful in universal cancer therapy. It was a serendipitous finding. The unexpected discovery was made when the researchers were analyzing blood samples for immune cells which could fight against bacteria. They accidentally discovered T cells a never before seen receptor which catches only cancerous cells ignoring healthy cells. The scientists discovered T- cells equipped with a new type of receptor known as T- cell receptor (TCR). It identifies and kills most human cancer cells. It easily identifies healthy cells and cancerous cells. Cancerous cells containing abnormal proteins are eliminated by T- cells. Small parts of cellular proteins that are bound to human leukocyte antigen (HLA) are identified by scanning system, this allows killer T-cells to see what's occurring inside cells. Researchers prevented creating a single T –cell based treatment that targets most cancers in all human beings because HLA varies between individuals. A unique TCR was identified by the Cardiff researchers which recognizes several kinds of cancer via a single HLA like molecule called MR1. T-cells equipped with the new TCR were shown, in the lab,to kill lung, skin, blood, colon, breast, bone, prostate, ovarian, kidney and cervical So far various studies on mice have yielded very encouraging results. According to an expert in T cell from Cardiff University t was highly unusual to find a TCR with such broad cancer specificity which raised the prospect of universal cancer therapy. As per the researchers, Lucia Mori and Gennaro De Libero from the university of Basel in Switzerland, the research is in budding stage and has reat potential to be explored as a future of cancer medicine. Professor Awen Gallimore, of the University's division of infection and immunity and cancer immunology lead for the Wales Cancer Research Centre, said: "If this transformative new finding holds up, it will lay the foundation for a 'universal' T-cell medicine,mitigating against the tremendous costs associated with the identification, generation and manufacture of personalised T-cells.

How does the new T-cell work?



SUSTAINABLE DEVELOPMENT GOALS (SDGs) & ROLE OF BASIC SCIENCES

Dr. Vinita Kapoor

What is IYBSSD?

The United Nations has declared year 2022 as the International Year of Basic Sciences for Sustainable Development (IYBSSD 2022). This declaration highlights the important role basic scientific disciplines such as physics, chemistry, mathematics, and biology can play in achieving the 17 Sustainable Development Goals (SDGs) adopted by the UN General Assembly.

IYBSSD 2022 proposes to encourage exchanges between scientists and stakeholders, be it grassroot communities or political decision-makers and international leaders, associations, students and local authorities. Throughout the year, researchers from all disciplines will reach out to the general public and decision-makers, both public and private, to support the development of basic sciences, particularly in areas where they are still underdeveloped. If this amalgamation takes place, the strategies and policies that are adopted to affect the SDGs will have results that improve people's lives.

What is Sustainable Development

Sustainable	→	*Something Which can be maintained for long period of time (For future generation)*
+		
Development	→	*Progress or Economic Development (for current generation)*
=		
Sustainable Development	→	Development which meet needs of current Generation without compromising ability of future generation to meet their needs

This concept can be best understood by what Mahatma Gandhi once remarked "One must care about the world one will not see".

What is Sustainable Development?

In contemporary times, the concept of sustainable development has assumed great importance. Sustainable development is a way of understanding the world and a method for solving global problems. The world population continues to rise rapidly and is expected to reach 8.6 billion by 2030. This increasing population needs basic essential things for their survival such as food, safe water, health care and shelter. According to FAO, there will be 1.8 billion people with acute water scarcity in 2025. Further, there is also a problem of continuing environmental degradation and climate change leading to rising sea-levels and increase in atmospheric temperature. This is where the concept of sustainable development comes into play. Sustainable development means 'meeting the needs of present generation without compromising the ability of future generations to meet their own needs'.

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

The United Nations in 2015 adopted 17 Sustainable Development Goals (SDGs), also known as the Global Goals, as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. These SDGs address the global challenges humanity faces, such as poverty, hunger, inequality, climate change, energy, food, water resources, environmental degradation etc. and are essential to improve the quality of life and well- being of the people across the world. One striking aspect of these SDGs is that they are all integrated and inter-dependent and thus balance social, environment and economic sustainable development - the three pillars of sustainable development.

BASIC SCIENCES FOR ACHIEVING SDGs

Science through research and technology can play a key role to help meet the challenges for sustainable development as it lays the foundation for new approaches, solutions, and technologies to identify, clarify and tackle global challenges for the future. As the nature and depth of the challenges relating to sustainable development vary from region to region, there can be no single road map for achieving these SDGs. Science is and will ultimately be a driver and enabler of inclusive and people-centred sustainable development. Some SDGs which benefit directly from advances in basic sciences and technology are as below :

Goal 2, Zero hunger: Fortification of food and crop can help combat malnutrition in areas with limited access to healthy foods. Scientific research needs to focus on protection of plants from pest infestations, ways to improve food production and minimize food spoilage.

Goal 3, Good health and well-being: Advances in medical diagnosis and drug development can enable people to live longer and healthier lives.

Goal 6, Clean water and sanitation: Newer methods of water purification and lower cost desalination can contribute to achieving universal access to safe and affordable drinking water. Water quality can be improved through the deployment of greener technologies and pollution prevention strategies.

Goal 7, Affordable and clean energy: Research needs to be done to address the scientific challenge of providing cheap and clean energy to the world by looking for alternative ways to renewable energy production.

Goal 9, Industry, innovation, and infrastructure: This goal seeks to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. Scientists should strive to conduct research that has an impact beyond the lab.

Goal 13, Climate action: Climate change is affecting every continent. It is disrupting national economies and affecting lives. Weather patterns are changing, sea levels are rising, and weather events are becoming more extreme. Focus is required to understand causes of global climate change, ways to mitigate and adapt to climate change.

India has taken many initiatives which, directly or indirectly, help in achieving SDGs. These include amongst others National Health Policy (NHP 2017), National Education Policy (NEP 2020), Swachh Bharat Mission, Pradhan Mantri Jan-Dhan Yojana, Deen Dayal Upadhyay Gram Jyoti Yojana, and Pradhan Mantri Ujjwala Yojana. India has recently imposed a ban on single-use plastic items and thus set a global example in the fight against plastic pollution.

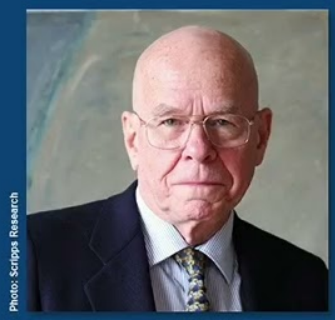
In conclusion, all the stakeholders need to be educated and encouraged to think and act responsibly towards our environment by adopting sustainable life - styles. It is imperative that we integrate sustainable development with education as quality education can go a long way in helping achieve the SDGs and enjoying a sustainable future.

The Nobel Prize in Chemistry 2022

October 5, 2022

Carolyn R. Bertozzi
Stanford University
USA

Morten Meldal
University of Copenhagen
Denmark



K. Barry Sharpless
Scripps Research
USA

The Nobel Prize in Chemistry 2022 was awarded jointly to Carolyn R. Bertozzi, Morten Meldal and K. Barry Sharpless "for the development of click chemistry and bioorthogonal chemistry".

The Nobel Prize in Chemistry 2022 is about making difficult processes easier. Barry Sharpless and Morten Meldal have laid the foundation for a functional form of chemistry – click chemistry – in which molecular building blocks snap together quickly and efficiently. Click chemistry revolutionized the options available to chemists for creating the molecules they desired. In 2003, Carolyn Bertozzi coined the term "bioorthogonal chemistry" for any kind of chemical reaction that could occur within a living system without interfering with it or harming it. She took click chemistry to a new level. To map important but elusive biomolecules on the surface of cells – glycans – she developed click reactions that work inside living organisms. Her bioorthogonal reactions take place without disrupting the normal chemistry of the cell.

These reactions are now used globally to explore cells and track biological processes. Click chemistry and biorthogonal reactions have taken chemistry into the era of functionalism. A major advantage of the techniques is that they don't introduce unwanted byproducts into reaction mixtures — they function with a clean efficiency that allows scientists to carefully craft complex molecules for a variety of purposes.

CROSSWORD

CROSSWORD

Across:

2. Named after a famous Robert, a burner used in chemistry is _____ burner.

5. _____ is a porcelain container to heat reactants in.

6.You can do titrations with this long glass tube.

8. Organic chemistry is the branch of Chemistry that deals with compounds containing_____.

9. Leguminous plants possess the unique ability to enter a symbiosis with soil resident _____ fixing bacteria called Rhizobia.

11. The serendipitous discovery of the most powerful antibiotic _____ by Alexander Fleming, proved to kill harmful bacteria without any toxic effects on humans.

12. The colour of iodine vapour is _____.

13._____ was the 2022 Nobel Prize winner for the development of Click chemistry and Biorthogonal Chemistry.

14. These metals in the middle part of the periodic table usually form coloured compounds are _____.

16.The alcohol produced by fermentation of sugars_____.

20._____ are porous, crystalline materials made of organic ligands and metal ions/ metal clusters linked by coordinative bonds.

22.Flammable gas produced when sodium reacts with water is called _____.

Down:

1.A type of substance that increases the rate of a reaction without being used up is called _____.

3. While working with coal tar, Fahlberg forgot to wash his hands before eating supper and found that the bread tasted extremely sweet; which was due to a chemical called benzoic sulfimide popularly called _____.

4._____ is the most expensive and valuable metal.

7._____ is the type of reaction that transfers energy to the surroundings, usually by heating.

10._____ is an anti-cancer chemotherapy drug; which is classified as an alkylating agent.

15. While working with gases related to refrigerants. Roy Plunkett made an unexpected discovery of _____; a frozen, compressed sample now-a-days used as coating in making non-stick cookware and waterproof fabrics.

17. The accidental discovery of _____ was by a chemist named James Schlatter who accidentally joined 2 amino acids(aspartic acid and phenylalanine) together while trying to create a new drug to treat stomach ulcers.

18. Roentgen noticed a glow on the sheet of paper coated with Barium Platinocyanide while experimenting with cathode rays which led to the discovery of _____.

19.A common name for concentrated sodium chloride solution is called _____.

21.The type of bonding in compounds of group 1 and group 7 elements is _____.

23._____ is the rarest unstable metal on earth and is also highly radioactive.

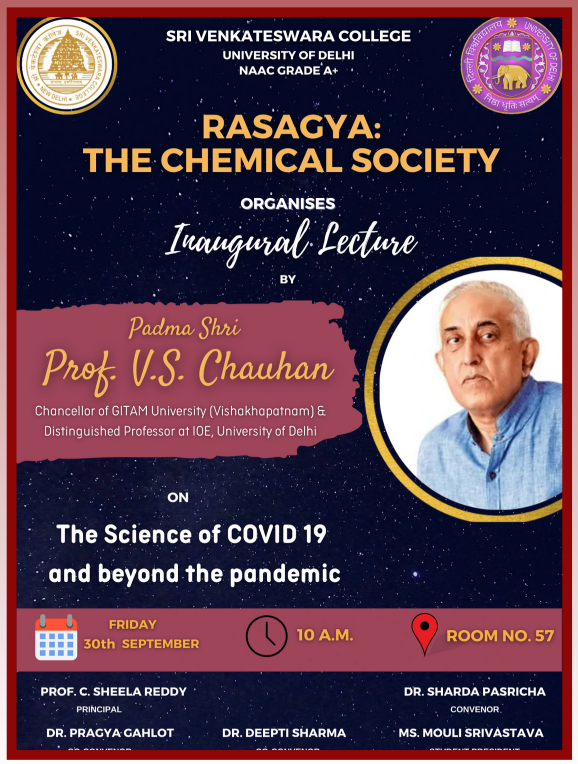
THE CHEMICAL SOCIETY: AN INTRODUCTION

"RASAGYA", the Chemical Society has been the most actively engaged division of the Chemistry Department which organises a number of extracurriculars including seminars, lectures, workshops, industrial visits, field trips, etc., all through the year. Students are regularly given opportunities to update their knowledge on recent development in science through interaction with outstanding chemists and researchers via lectures or seminars. Visits to reputed labs, institutions and industries each year give students necessary scientific exposure of the real working world outside college. Moreover, various other extracurricular events being conducted over the year improve, to a great extent, their interpersonal skills, personality, and leadership potential simultaneously strengthening the bonding between students and teachers. Furthermore, the society routinely engage the students in alumni interaction programme.

THE CHEMICAL SOCIETY ACTIVITIES

LECTURE ON "THE SCIENCE OF COVID-19 AND BEYOND"

The Chemical Society hosted the Inaugural Lecture of this year on September 30,2022 by Padma Shri recipient Prof. V. S. Chauhan (Chancellor, GITAM, Visakhapatnam, Distinguished Professor at IOE, University of Delhi) on the topic "The Science of COVID 19 and beyond the pandemic". The lecture proved quite fruitful in making the students aware of the development in virus study as well as the role of viruses in other illnesses in the present scenario, such as COVID 19, monkey pox, Zika virus etc. Moreover, students were made well acquainted with the potential career opportunities that Chemistry-Biology synergy can provide them in future.



SKILL DEVELOPMENT WORKSHOP ON "HOW TO WRITE A SPOTLIGHT ARTICLE"

As much as learning is an ongoing process, skill development and skill enhancement follow the same trend. One ought to continuously look for ways to develop his/her skills, abilities and competencies to enhance his/her performance. In view of this, the Chemical Society organized a skill-development workshop on "How to Write and Publish a Spotlight Article" on October 31, 2022, with Prof. Laurence Harwood, Editor-in-Chief of SynOpen, and Dr. Rohit Bhatia, Acquisition Editor of Thieme Scientific and Medical Publisher as the keynote speakers. The event tactfully enlightened our students with the skill and various steps in detail towards writing and publication spotlight articles.

RASAGYA'S ORIENTATION FOR FIRST YEAR STUDENTS

In order to give an insight into the functioning of the Chemical Society and how students can benefit from being a part of the society, An Orientation Program of the Chemical Society was also organized on 24th January 2023 especially for the first-year students. The freshmen got an opportunity to interact with the students and faculty members who have been an integral part of the Society.

QUIZ "WAR OF CHEMTHINKERS"

The Chemical Society well understands the fact that quizzes nowadays can be used as a tool for self-improvement as well as a great way to have fun while learning. They can help us assess more about ourselves and how others view us. With this purpose, RASAGYA, in association with the IQAC, organized an Online Quiz Competition, titled "WAR OF CHEMTHINKERS", on 6th January, 2023 for the 1st year Chemistry Hons. Students. The event gave students the chance to assess their conceptual comprehension, which ought to have motivated them to focus more on their areas of weakness.

SKILL ENHANCEMENT SESSION

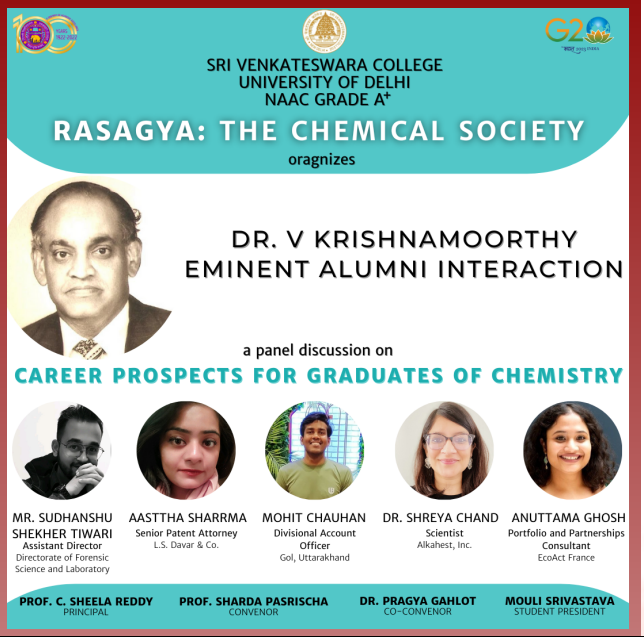
In order to excel in the field of research particularly in science, one needs to understand the functioning and applications of various modern instrumentations, tools and techniques. Considering this fact, the chemical society took the students to University Scientific and Instrumentation Centre (USIC), University of Delhi, North campus on 15th February 2023 for a Skill Enhancement Session to experience various instrumentation techniques like X- ray diffraction, electron microscope, SEM, TEM, UV-Visible, IR, NMR etc. in order to enhance their instrumentation skills.

ADD ON COURSE ON "INTRODUCTION TO DRUG DESIGN AND DRUG DEVELOPMENT"

Nowadays apart from the normal curriculum-based teaching and learning, students need to be trained and oriented toward the career direction of their choice in achieving which introduction of add-on courses prove to be quite beneficial. With a purpose to provide a comprehensive understanding of the principles and practices of medicinal chemistry, an add-on course of two and half month duration was introduced by the Department of Chemistry. The program had an auspicious start with the inaugural function held on 22nd of March 2023 wherein eminent persons like Dr. Mukesh Sharma Director API, CRD, Teva Pharmaceuticals; Dr. Gagan Kukreja Senior Leader Investigator Integrated Drug Discovery Syngene International; Prof. D. S. Rawat Department of Chemistry University of Delhi. and Prof. N. Latha Head, Department of Biotechnology, Bennet University addressed the gathering and enlightened the students with valuable knowledge. The program is expected to be beneficial for students who desire to pursue a career in pharmaceuticals, biotechnology, or academia. The course will equip students with the knowledge and skills to work in drug discovery and development, medicinal chemistry, and related fields. The program is well planned with a purpose to provide a strong foundation for further studies in chemistry or related fields. In due course, students will learn about the different classes of drugs, their mechanisms of action, and the factors that influence the efficacy and toxicity of drugs.

DR. V. KRISHNAMOORTHY EMINENT ALUMNI INTERACTION

An Alumni interaction cum panel discussion on career prospects for graduates of chemistry was organised on 24th March 2023 in which our students were given opportunity to have an interaction with alumni of the Chemistry Department of the college Ms.Anuttama Ghosh, Mr. Mohit Chauhan, Ms. Aastha Sharrma. Dr. Shreya Chand and Dr. Sudhanshu Shekher Tiwari who are being well placed and successful in their career in diverse fields. The programme enlightened and encouraged them with the endless career opportunities with chemistry as their choice in graduation can offer in life.



Jashn -e- Rasayan

THE ANNUAL FEST

Rasagya, the Chemical Society, of Sri Venkateswara College organised "JASHN-e-RASAYAN", its annual fest, from 26.04.23-27.04.23. It was a time of joy, and excitement, both among the teachers and the students. There were 6 events in total, over the span of 2 days.

On the first day, the first event was the inaugural lecture "ORGANOCATALYTIC TRANSFORMATION OF FEEDSTOCK MOLECULES TO VALUE-ADDED PRODUCTS AND ITS MECHANISTIC INVESTIGATION", given by Prof. Chinmoy Kumar Hazra, from IIT Delhi.

The 2nd event being "AD-MAD", an 'Advertising Campaign Competition' for students to showcase their creative business skills in marketing products and services.

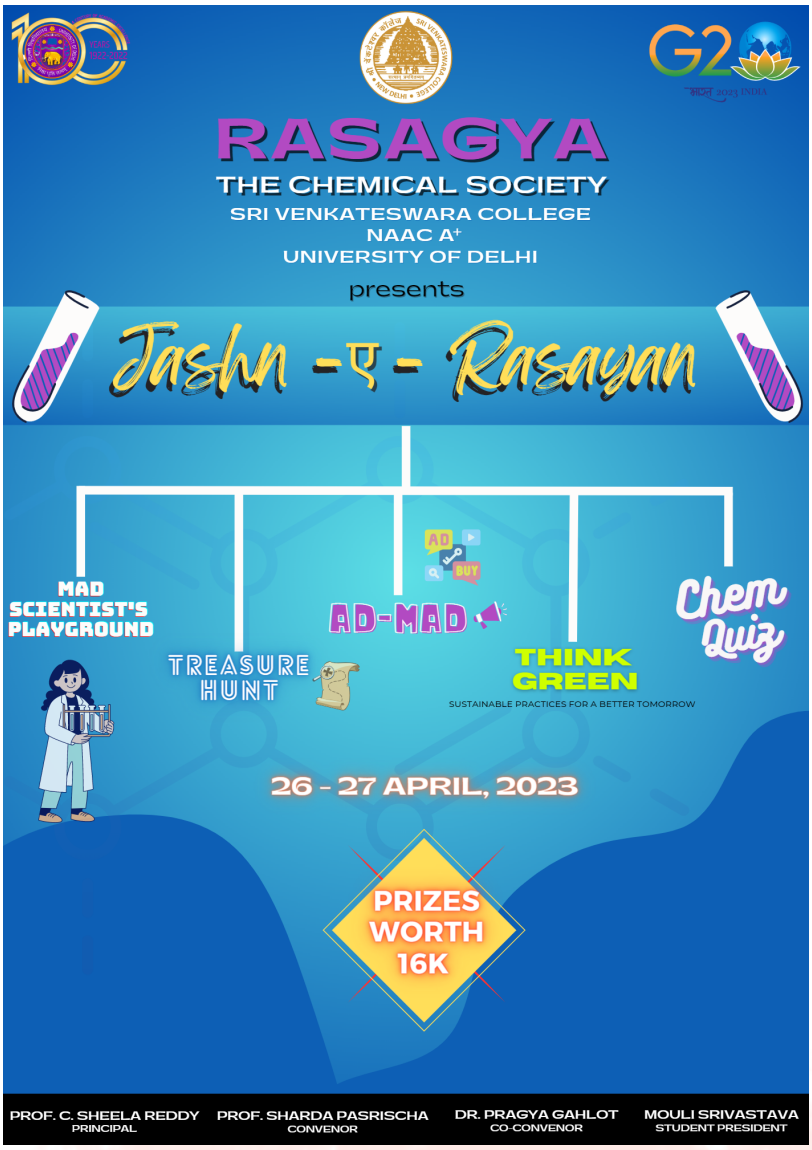
The 3rd event of the day was "MAD SCIENTIST'S PLAYGROUND", in which students had to demonstrate fun experiments from the field of science.

The last event for the day was "TREASURE HUNT", which was the highlight of the day. It had two rounds- Collectathon, and clue hunting.

On the second day, the first event was "THINK GREEN", an event designed to focus on proposing sustainable solutions to real-life problems. The problem could be in labs, college, neighborhood, or anywhere else. The teams' task was to propose a sustainable solution to their chosen problem, which would address economic, environmental, and social factors to create a balance. They were also supposed to consider the long-term effects of their solution on the community and the environment.

The last event of the fest was "CHEMQUIZ", which was a science-based quiz competition. The students had fun, and they gained some intellect through this event.

With this, our fest came to a sweet end, and then our president, Ms. Mouli Srivastava, gave the valedictory speech.



MEET THE STAFF

Teaching

Left to right:

Top row: Dr. Murali Mohan Achari Kamsali, Dr. Ravindra Kr. Upadhyay, Dr. Vinita Kapoor, Dr. Thoti Vasantha, Dr. Shikha Gulati, Dr. Meena Bisht, Dr. Neelam Kumari, Dr. Seella Ramanaiah, Dr. Ramavath Janraj Naik, Dr. Yenugu Veeramanohara Reddy,

Bottom Row: Mr. Harshvardhan Meena, Dr. Pooja, Dr. Rangarajan T.M., Prof. Sanjay Batra, Dr. Mercy Kutty Jacob, Prof. Sharda Pasricha, Dr. Vibha Saxena, Dr. Shefali Shukla, Dr. Pragya Gahlot, Dr. Rekha Yadav, Ms. Laisharam Saya Devi, Dr. Chandra Sekhar Tekuri

Non-Teaching

Left to right:

Top row: Ramniwas, K C H Adinarayna, Anil Kumar, M Venkatpati Rao, Tersem, Vinod, Ashish Giri, Anil Kumar

Bottom Row: K Vasantha Rao, Shitla Prasad, Yogender, C H Venkateswara Rao, Sachin, Jatin, Nikhil, Neetu, Anjana, Baljeet, M Venkateswara Rao

TEACHERS ACHIEVEMENTS

BOOK AUTHORED

Dr. Shikha Gulati - 1

Ms. L. Saya - 1

Dr. Pooja - 1

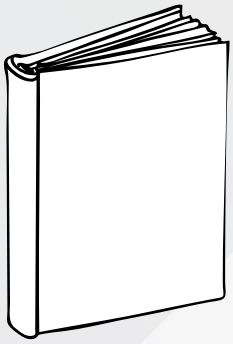
BOOK CHAPTERS

Prof. Sanjay Kumar - 13

Dr. Shefali Shukla - 3

Dr. Shikha Gulati - 21

Ms. L. Saya - 4



BOOK EDITED

Dr. Shikha Gulati - 2

Dr. Pooja - 1

ARTICLES

Dr. Vinita Kapoor - 2

ARTICLES EDITED

Dr. Meena Bisht - 1

e-CONTENT

Dr. Vinita Kapoor

ADD-on COURSE

Prof. Sharda Pasricha

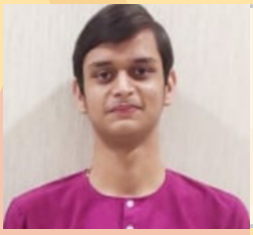
Dr. Pragya Gahlot

Dr. T.M. Rangarajan

STUDENT ACHIEVEMENTS

MAYANK DHAWAL (3RD YEAR)
ECO CLUB, PRESIDENT 2022-23
AARAMBH, JOINT SECRETARY 2022-23
CONNECTING DREAMS FOUNDATION, MEMBER 2022-23
FINES ART ASSOCIATION, MEMBER 2022-23

SACHIDANAND AND SRISHTI YADAV (3RD YEAR)
SPOTLIGHT ARTICLE- SOLID-SUPPORTED HETEROGENIZED PALLADIUM NANOPARTICLES: PROPITIOUS VEHICLES FOR SONOGASHIRA CROSS-COUPLING REACTION
IIT JAM RANK 100
SRISHTI YADAV- IIT JAM RANK 141



MADHAV DUTT (2ND YEAR)
PRESENTED A POSTER (PEER REVIEWED) IN 27TH - ISCB (INDIAN SOCIETY OF CHEMISTS AND BIOLOGIST), INTERNATIONAL CONFERENCE (ISCBC-2022) AT BITS, RANCHI.

SWETA KUMARI (3RD YEAR)
GENERAL SECRETARY OF EOC SOCIETY
CHAPTER PUBLICATION IN BOOK MOFS AS CATALYST.

MANSI (3RD YEAR)
PUBLISHED TWO REVIEW PAPERS IN INTERNATIONAL JOURNALS - ROYAL SOCIETY OF CHEMISTRY AND ELSEVIER,
2 CHAPTERS IN A BOOK 'MOFS AS CATALYST' AND
1 CHAPTER IN A BOOK 'CHITOSAN-BASED NANOCOMPOSITE MATERIALS'

BHUPENDRA SINGH (1ST YEAR)
SELECTED FOR PROJECT ORIENTED CHEMISTRY FELLOWSHIP PROGRAMME (POCE) - 2023 AT JNCASR

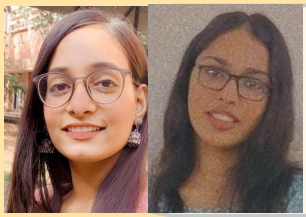
SNEHA VIJAYAN (3RD YEAR)
REVIEW PAPERS
RECENT ADVANCES IN THE APPLICATION OF METAL ORGANIC FRAMEWORKS BASED NANO CATALYSTS FOR DIRECT CONVERSION OF CARBON DIOXIDE TO VALUE ADDED CHEMICALS.MAGNETIC NANOCARRIERS ADORNED ON GRAPHENE.

LAKSHITA CHHABRA (2ND YEAR)
GENERAL SECRETARY OF NRITYANGANA (INDIAN DANCE SOCIETY)
2022-2023
PUBLICATION OF BOOK CHAPTER-INTRODUCTION TO CHITOSAN
AND CHITOSAN-BASED NANOCOMPOSITES.

RACHIT WADHWA (3RD YEAR)
2 REVIEW ARTICLES AND 1 BOOK CHAPTER PUBLISHED
WESTERN ACAPELLA CHOIR COMPETITIONS:
1ST AT ENGIFEST'23, DTU, 2ND AT ODYSSEY, 1ST POSITION AT MADRIGAL'22-JMC,
2ND AT RHYTHAAR'22-LADY IRWIN COLLEGE, 2ND AT RACHNOTSAV'22-
HANSRAJ COLLEGE, 3RD POSITION AT MOOD-I'22-IIT BOMBAY

ARIKTA (3RD YEAR)
ARTICLES 1)ECO-FRIENDLY AND SUSTAINABLE PATHWAYS TO
PHOTOLUMINESCENT CARBON QUANTUM DOTS 2)RECENT PROGRESS, SYNTHESIS,
AND APPLICATION OF CHITOSAN-DECORATED MAGNETIC NANOCOMPOSITES
BOOK CHAPTERS 1)INTRODUCTION TO CHITOSAN AND CHITOSAN-BASED
NANOCOMPOSITE 2) INTRODUCTION TO METAL-ORGANIC FRAMEWORKS

ANOUSHKA AMAR (2ND YEAR)
PUBLICATIONS-ECO FRIENDLY AND SUSTAINABLE PATHWAYS
TO PHOTOLUMINESCENT CARBON QUANTUM DOTS STRATEGIES FOR SYNTHESIS
AND CHEMICAL MODIFICATIONS OF CHITOSAN- BASED NANOCOMPOSITES
RECENT PROGRESS, SYNTHESIS AND APPLICATIONS OF CHITOSAN-DECORATED
MAGNETIC NANOCOMPOSITES



TANU AND MEENAKSHI (2ND YEAR)
PUBLICATION OF BOOK CHAPTERS-CHITOSAN BASED NANO
COMPOSITES AS REMARKABLE EFFECTUAL WOUND HEALING AGENTS.
CHITOSAN BASED NANO COMPOSITES AS REMARKABLE
EFFECTUAL WOUND HEALING AGENTS.

DIVYA YADAV (3RD YEAR)
SPOTLIGHT ARTICLE-
SOLID-SUPPORT HETEROGENIZED PALLADIUM NANOPARTICLES
: PROPITIOUS VEHICLES FOR SONOGASHIRA CROSS- COUPLING REACTION.

VANSHIKA (2ND YEAR), SANJANA (3RD YEAR)
GROUP FOLK DANCE COMPETITION
1ST PRIZE -VIVEKANANDA, MAITREYI & AUROBINDO COLLEGE
2ND PRIZE - MATA SUNDARI COLLEGE, 3RD PRIZE–KALINDI COLLEGE & BRAC
4TH POSITION - MIRANDA HOUSE

FAREWELL' 22

Farewell party is a great way to send off your friends and loved one with great memories as the graduated students are moving ahead to start a new chapter of their life in different capacities. It is a commemoration to celebrate the cherished moments and happy times of every individual of the chemistry family.

Farewell party was organized by first year and second year students on 7th May, 2022, where final year students narrated their experiences as well as guided their junior students.

The day also included some performances and activities by the chemistry students. It was a day filled with mixed emotions where students took blessing from their teachers and good wishes of their friends for their future endeavours.

RETIREMENT OF H.C. TANDON SIR

Wish you a Long, Happy and Healthy Retired life Dear Tandon sir!!

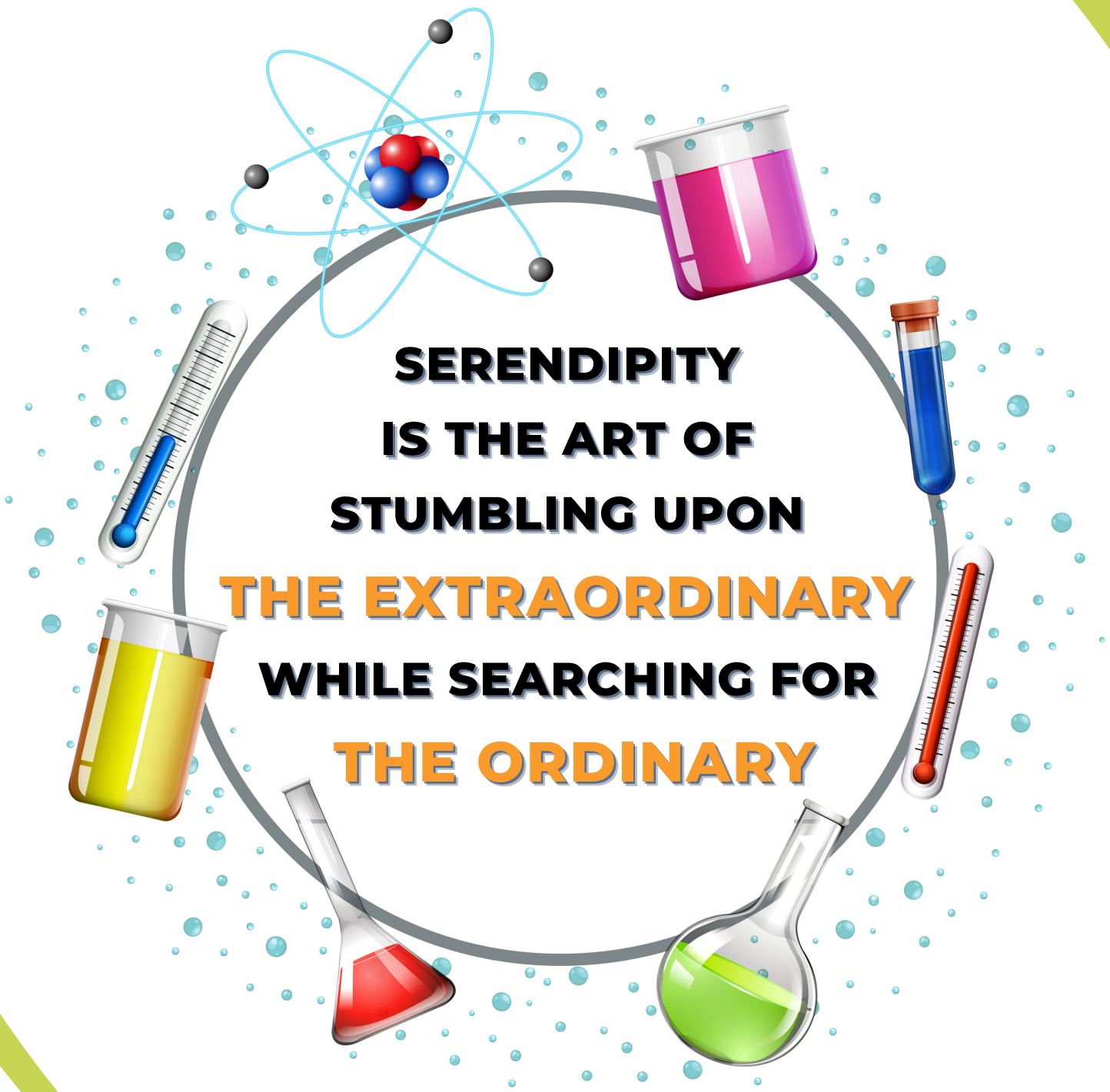
Retirement is a milestone in a person's life. Saying goodbye to a person with whom you have worked for years is really difficult. The chemistry department bid farewell to Associate Professor, Mr. HC Tandon to acknowledge his 40 work years for this institution. For Sir, retirement is just the withdrawal from his active working life but it is a new beginning of his fully dedicated spiritual journey. Besides being a great teacher, sir has always been a great mentor for all of us. He has contributed towards the corporate life of the college as president staff association, staff advisor, and convenor of various committee. May your retirement life be truly remarkable!

FRESHERS' 23

Freshers party is an event which every student eagerly awaits from their time of admission. It is a kind gesture of a warm welcome for the newbies given by second and third year students. Freshers party gives the first opportunity to the new students to interact with their seniors, make friends, and get familiar with the new campus. Freshers party 2022 was organized by the students of Department of Chemistry on 13th February, 2023. It was a fun filled event where all chemistry students, including the freshers, showcased their talents as singers, dancers, story tellers, writers, poets etc.
On that day various games and activities were organized and various titles were also given to winners such as Mr./Miss Fresher and Mr./Miss Performer. It is one of the most memorable times for a new student. Many magical moments were captured that day to surround everyone with happy memories for a lifetime.

FAREWELL' 23

As the graduated students move on to begin a new chapter of their lives in various capacities, a farewell party is a wonderful way to send off your friends and loved ones with wonderful memories. It is a celebration of the special times and happy memories for each member of the family. On April 29, 2023, second-year students planned a farewell party where senior students guided their junior students and shared their experiences. The chemistry students also participated in some performances and activities throughout the day. Students received encouragement from their teachers and well wishes from their friends for their future endeavours on this day of conflicted emotions.



SERENDIPITY
IS THE ART OF
STUMBLING UPON
THE EXTRAORDINARY
WHILE SEARCHING FOR
THE ORDINARY