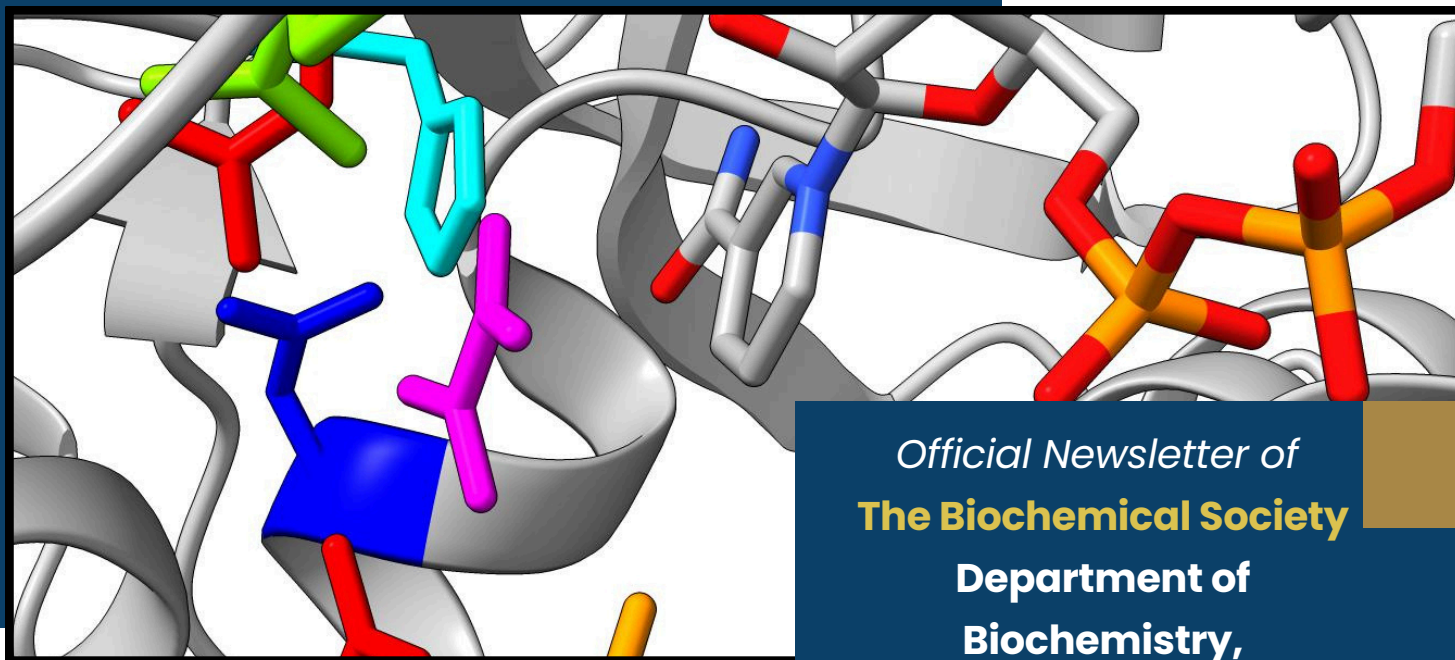


# BIOCHEMIA

ISSUE 1 • APRIL 2024 • INAUGURAL EDITION



*Official Newsletter of*  
**The Biochemical Society**  
Department of  
Biochemistry,  
St. Joseph's University,  
Bengaluru, India.



## The Biochemical Society

Of  
St. Joseph's University,  
Bengaluru.

*Unravelling Life*



Officially launched on

**Tuesday, April 30, 2024**

<https://www.sju.edu.in/departments/st-joseph-university/school-of-chemical-sciences/departments-of-biochemistry>



# TABLE OF CONTENTS

## IN THIS EDITION:

**Editorial** - Dr. Sangita Das - Page 2

---

**Vice Chancellor's Message** -  
Rev. Dr. Victor Lobo - Page 3

---

**Dean's Message** - Dr. Libi Thomas - Page 3

---

**Students' Contributions** - Pages 4 to 23

---

**Faculty Contributions** - Page 24 to 27

---

**Faculty Achievements** - Pages 28 to 30

---

**Students' Achievements** - Pages 31 & 32

---

**Department Association  
Report (2023-2024)** - Pages 33 to 45

---

**Solutions to Puzzles** - Pages 46 & 47

---

**President's message** - Apoorva Walters - Page 48

---

**"Signing Out"** - Closing Remarks  
by Dr. Sandra Misquith - Page 49

---

**Acknowledgements** - Page 50

---

**Department Advertisement (2024)** - Page 51



# BIOCHEMIA 2024



## This issue:

In this first edition of the BIOCHEMIA newsletter, we have many exciting contributions from the students and faculty members of the department.

**Editorial**

**Students' contributions**

**Biochemical Society Report  
(2023 - 2024)**

**Dean's Message**

**Teachers' contributions**



The  
Biochemical  
Society

of  
St. Joseph's University,  
Bengaluru.

*Unravelling Life*

# Editorial

**Dr. SANGITA DAS**

**ASSISTANT PROFESSOR,  
DEPARTMENT OF BIOCHEMISTRY, SJU**

Science has become an integral part of our daily lives, enhancing our understanding of the world and enriching our experiences. From the moment we wake up, the technology-driven alarm clock reminds us of the presence of science. As we enjoy a nutritionally balanced breakfast, we see the influence of science in food production and preparation. Even our commute, powered by efficient transportation systems, is a testament to the progress driven by scientific advancements.

In healthcare, groundbreaking scientific discoveries have enabled early disease detection, personalized treatments, and improved quality of life. From the development of life-saving medications to the advancement of medical imaging technologies, science empowers us to live healthier and longer lives.

Beyond healthcare, science fuels innovation in every field, from agriculture and energy to communication and entertainment. It drives the creation of sustainable solutions to environmental challenges, paving the way for a more harmonious relationship between humanity and the planet. Moreover, science fosters curiosity and critical thinking, encouraging us to question, explore, and seek a deeper understanding of the world around us. This thirst for knowledge and the ability to think critically are invaluable assets that shape our personal and professional growth.

The Department of Biochemistry, SJU, Bangalore, is a vital place where scientific exploration meets the intricate details of life at the molecular level. Its work is closely connected to various scientific fields, including biology, chemistry, medicine, and biotechnology.

Over the next few years, our department's goals are likely to advance research frontiers, by conducting leading-edge research in areas like molecular biology, enzymology, and bioinformatics, the department aims to expand scientific knowledge and contribute to breakthroughs in understanding biological processes. Our goals also include innovating in biomedical applications with a focus on translational research, the department seeks to understand new diagnostics, therapies, and interventions based on biochemical principles. This could involve exploring novel drug targets, designing molecular probes for disease detection, or developing personalized medicine approaches.



**"science fosters curiosity  
and critical thinking,  
encouraging us to question,  
explore, and seek a deeper  
understanding of the world  
around us"**

**SINCERE THANKS TO THE OFFICE  
BEARERS OF THE BIOCHEMICAL  
SOCIETY 2023-2024**



# VICE-CHANCELLOR'S MESSAGE

“In the realm of Biochemistry, every atom is a storyteller revealing the secrets of life’s molecular dance, unlocking the greatest mysteries of life.” – **Aloo Denish, Kenyan Biochemist, Leader and Writer**



Congratulations to the Department of Biochemistry on bringing out the department’s very first newsletter called Biochemia. I welcome the artistic approach taken to present the scientific aspects of the department. Being a relatively young department, the staff and students have still made their presence felt in the institution. This is the very first edition and yet effectively combines biochemical concepts with art, humour, puzzles, poetry, interesting facts, and updates on the achievements of the department’s faculty and students. The hard work, creativity and detailed account of all the activities have elevated the design of this newsletter. Biochemia further evinces that the institution focuses on activities beyond the classroom space and indeed this will pave the way for several other informative and developmental activities to be conducted in the Institution. Great job all the staff and students of the Department of Biochemistry!

**Rev. Dr. Victor Lobo SJ**  
**Vice-Chancellor**  
**St Joseph’s University**



## DEAN’S MESSAGE

Hearty congratulations to the Biochemical Society for bringing out their first newsletter!

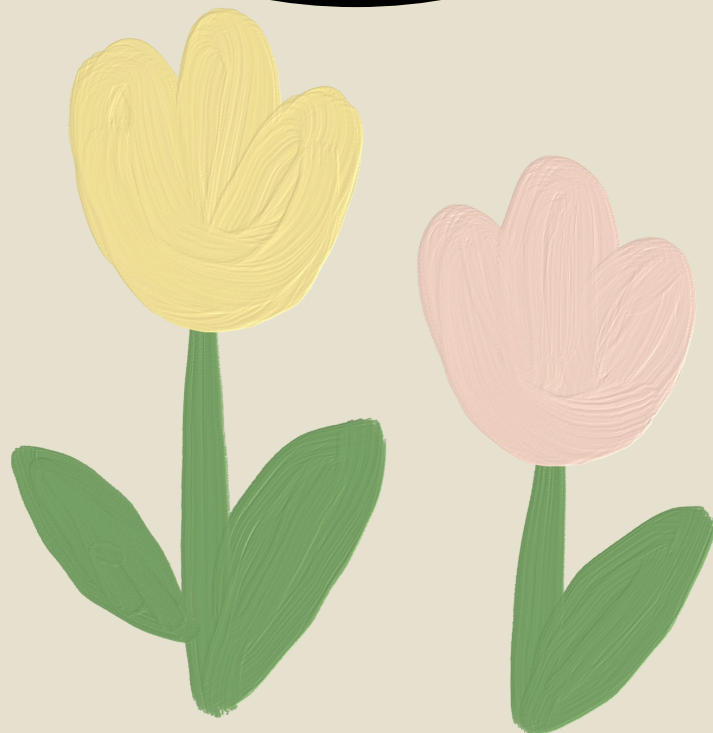
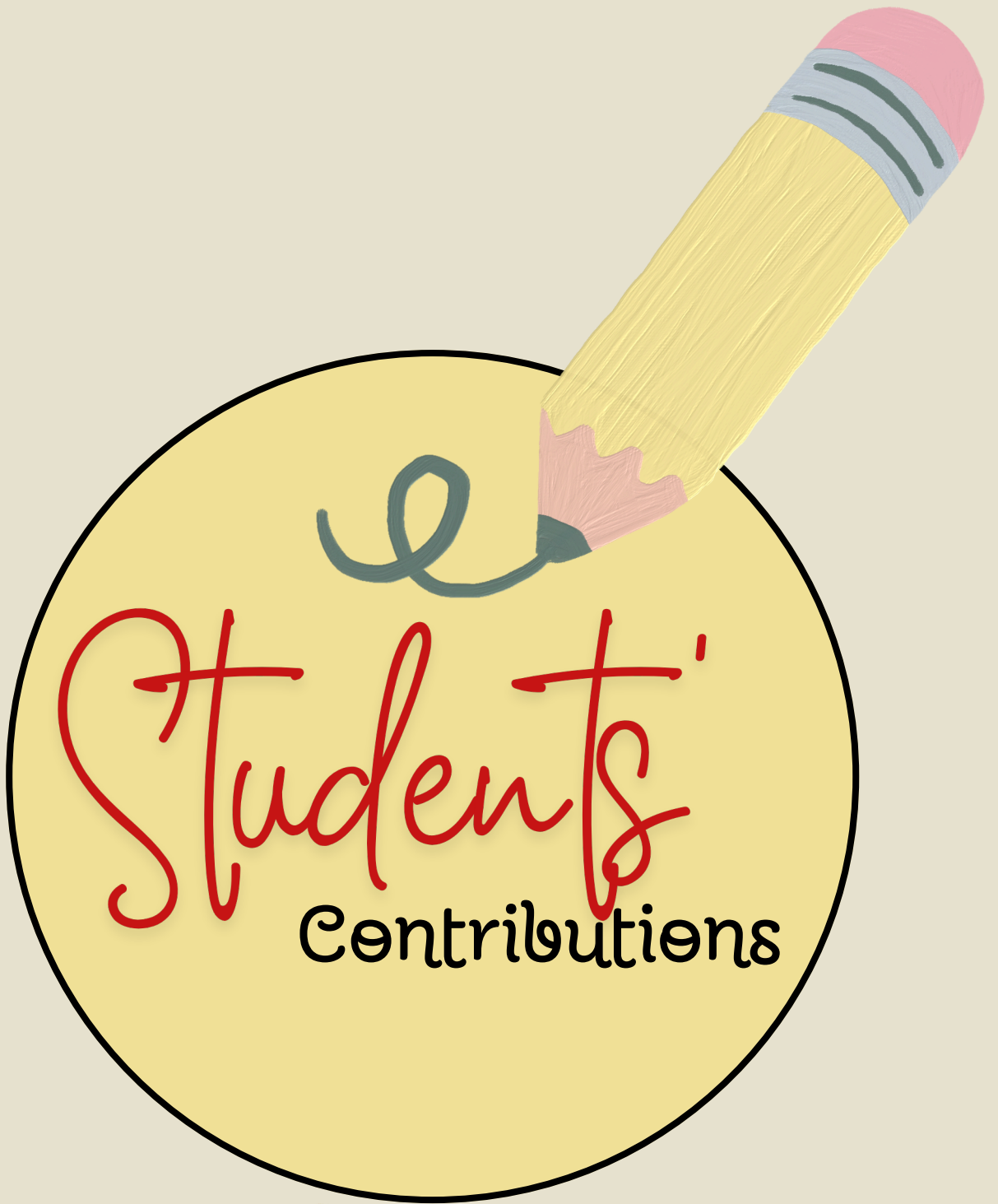
The Biochemical Society was abuzz with activities throughout the academic year. This newsletter would not only help the society showcase its activities and achievements but also allow the members to try creative and scientific writing.

The semester is coming to an end. You have worked hard throughout these months to meet deadlines and overcome challenges. You have completed projects, made new friendships, explored a new hobby, or acquired a new skill. Now, it's time to take a moment to reflect on the eventful journey, efforts, accomplishments, and personal growth. Cherish the moments of supporting one another, sharing notes, teaching someone, and lending a hand. Remember, learning is not just about grades; it is about personal growth and gaining the knowledge and skills to improve.

Some of you will choose new paths, while others will return next semester. Explore and pursue your passion. Stay connected, share memories, and keep learning.

Best wishes!

**Dr. Libi Thomas,**  
**Dean of Chemical Sciences, SJU**



## FINAL YEAR BBZ STUDENTS



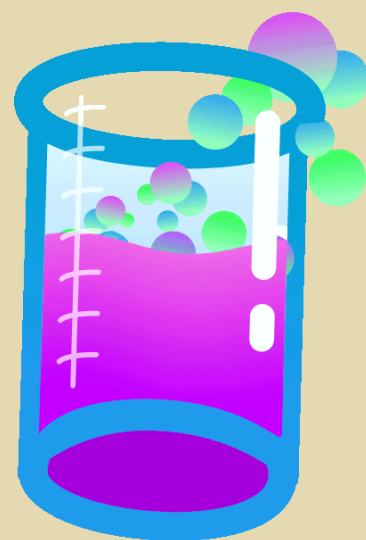
ART BY

**JYOTISMITA  
CHAKRABORTY  
(21BBZ40)**

**CHEMICAL  
EQUILIBRIUM**

**Poem by;  
Aditi Vishwanath  
(21BBZ52)**

The reaction went forward,  
it then proceeded backwards.  
"What is going on?", her agog brain wondered.  
Beyond measure, she was bewildered.  
A catalyst, little Luna wanted to add,  
"but, what if the experiment then goes crazy bad?"  
She waited, and waited, and waited.  
Time ceased, even the isolated system had failed to please.  
Where was it that Luna went wrong?  
Right then, it hit her like a song,  
"the reaction is still going on!"  
*Howbeit*, it is under equilibrium, she declared.  
The entropy had lessened,  
The reaction no longer hastened,  
Little Luna had herself tightly fastened, as she jubilantly proclaimed,  
"anything stupendous could now happen!"





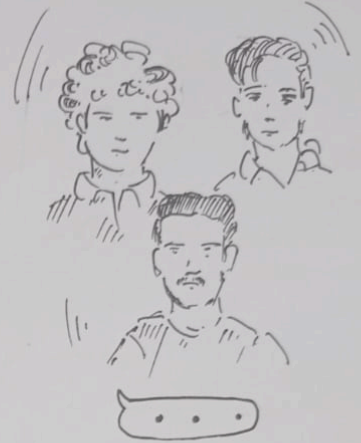
Here, Siddharth artistically captures the teacher-student rapport between him and Dr. Sandra. "Okay, I will see you next class", she says in her usual style. But then, sadly, she will take class for 21BBZ batch one last time. She will forever remain a legendary teacher, whose teaching and persona is unforgettable. She has a permanent place in the students' hearts and minds. In the picture, even though she is depicted saying "finally!! Bye", (knowing Dr. Sandra), she too would miss the current batch of senior students. Such memories remain for a lifetime and those must be cherished.

**SIDDHARTH SEN  
(21BBZ57)**

## Biochemistry Buffoonery



okay, I will see you next class.



Ma'am, there is no class next week. It's over!



Siddharth Sen  
23/4/24

"The art of teaching is the art of assisting discovery."

- Mark Van Doren





**ART AND QUOTE**

**BY**

**JYOTISMITA  
CHAKRABORTY  
(21BBZ40)**

“Life isn't about waiting for the storm to pass. It's about learning to dance it out”

## **Squalene and its clinical usage**

**Sneha B.  
(21BBZ75)**



The naturally occurring hydrocarbon squalene has grown into a progressively more well-known molecule for its prospective medical uses. It comes from plants like olives and is found in our skin. It has interesting qualities that might be good for human health. The potential for it to combat cancer is one intriguing area. According to studies, squalene may have anti-tumor and growth-inhibiting properties. Even though it's now employed as a supportive therapy, future research may make it a more important part of cancer treatment. Beyond cancer, squalene may be able to help prevent free radical damage to cells, which could help lessen problems like heart disease and neurological diseases. Furthermore, organs with limited oxygen supply may benefit from its capacity to enhance oxygen transport throughout the body. Due to its inherent skin-beneficial properties, squalene is a widely used component in skincare products. Its moisturizing and shielding properties can lessen wrinkles, enhance the texture of the skin, and protect it from the elements. Squalene is a prospective candidate for a variety of clinical uses, making it an exciting candidate with possibilities for enhancing human health and well-being. This is due to its natural origin and varied range of potential applications.

**Sneha Lakshmi  
(21BBZ09)**

## **SAYING STORIES WITH SCIENCE**

As a student of science, I've witnessed firsthand what it's like to be in awe and in fear of learning something new. Science itself is a systematic body of knowledge based on evidence and observation, and the language in which it is taught to the world is one that is formal and, more often than not, scary. As learners of science, it becomes imperative to look for ways for young learners to thrive in this world of jargon and precision. That way can be by going back to simpler things, like telling a story. The way we order our lives and make sense of its ambiguity is by building our own narratives, which is by ordering our reality to a narrative that resonates within us.

The aspect of storytelling that makes the stories everlasting in our memories is the associated emotion. In the process of scientific education, while mirroring the scientific thought process, what the language often misses out is the room for simplicity and "fun". Emotions stay longer than references to scientific evidence or use of technical terms. However, this is not to advocate for a dumbing down of science but rather choosing a language (albeit less formal) one that impacts and resonates with the intended audience. In the era of YouTube learning, virtual reality and AI, where education extends well beyond the classroom, it is becoming increasingly evident how learning imparted on various platforms differs from that of traditional academia, but the onus of making it fun cannot rest solely on the shoulders of educators. There must be a change bottom up in the system. The ability to connect with science and apply concepts to situations relevant to the learners, their lived experience, and pre-existing knowledge will help improve student motivation and enable them to have meaningful experiences with science. As with any one's childhood, the best stories, the ones that remain with us, are the ones that are simple and meaningful. The same can be used as a way to view science education, as young learners, telling stories, making characters, and most importantly engaging with these concepts in a meaningful manner. This will ensure science remains accessible to all, and that is where our hearts as learners of science should be.

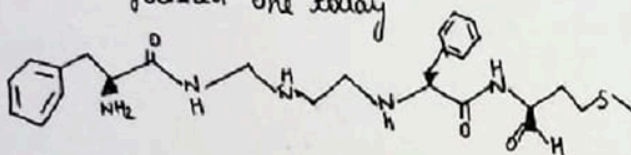
## SECOND YEAR STUDENTS

# BIOCHEMISTRY OF EMOTION

## ENDORPHINE

PAIN RELIEVER

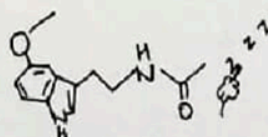
**PAIN** :- when you have an exam  
very next day after you just  
finished one today



**VANDANA PANDEY**  
**221BCMB14**

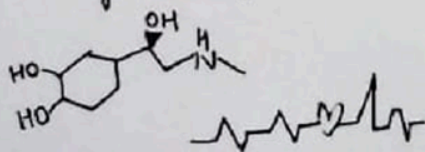
## MELATONIN [SLEEP]

**SLEEP** :- In Night I can't sleep  
In morning I can't wakeup.



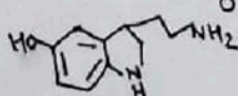
## ADRENALINE

**(FEAR)** :- When you forgot  
your ID card at home  
and your dad's driving  
you to school.



## SEROTONIN

**HAPPINESS** :- When you have a  
good company along  
with lots of good food  
on a bad day.



Vandana pandey  
221BCMB14



# CANNIBALISM IN DROSOPHILA MELANOGASTER

**Aishi Mandal  
(221BCBT08)**

*Drosophila melanogaster* is a common fruit fly that all of us have seen near overripe or rotten fruits and near fruit peels. Drosophila are known to be detritivorous herbivores who under normal conditions feed on rotten vegetables or fruits. However, different studies say that drosophila larvae tend to eat the drosophila eggs when deprived of nutrition. Drosophila eggs are rich in amino acids, sugars, proteins, carbohydrates, lipids and RNA. Thus drosophila eggs serve as a great source of nutrition for the drosophila larvae. There are three stages in the development of drosophila larvae - first, second and third instar. After a drosophila larva has been hatched from a mature egg, the 24, 48 and 72 hour old larva is known as first, second and third instar, respectively. The cannibalistic behaviour is not dependent on the developmental stage or size of feeding larvae. There are specific nutrients present in the diet of drosophila flies like salt, sugars, proteins and yeast which they have a predilection for. The behaviour of drosophila flies is different in different environments or social surroundings. With increase size or density of the population, flies interact more with the help of their olfactory senses.

Studies have also found that after laying eggs, the mother drosophila fly cloaks the eggs with the pheromone 7,11-heptacosadiene(7,11-HD) which protects the eggs from cannibalism. This pheromone is basically a hydrocarbon chain which is present in the waxy layer of the egg shell and this waxy layer is present in between two other layers. Pickpocket gene function (ppk23) is required in order to detect the pheromone 7,11-HD. ppk23 gene is involved in determining sexual behaviour in drosophila flies.

## Bee Vaccine

**Aishi Mandal  
(221BCBT08)**

**&**

**Alvita Davis  
(221BCBT03)**

Honey bees are an important part of the environment. They help in producing essential products like honey, beeswax etc. Also, they are one of the most important pollinators contributing to 1/3rd of the world's crops. However, there is a reduction in their population and one of the major reasons for this is the American Foulbrood Disease (AFB). Dalan, an American insect and invertebrate health company is the first to come up with a bee vaccine, for which, they were granted a license by the USDA.

The working of the vaccine is based on oral immunization through transgenerational immune priming, which is basically the transfer of immune responses from the parents to the progeny. The vaccine is easy to register. It is mixed with queen candy, which is the food. This candy reaches the worker bees, which then produce royal jelly in their glands. This royal jelly is fed to the queen bee. The royal jelly consisting of the vaccine is digested by the queen bee and reaches their ovaries. This is how the vaccine reaches the developing eggs and as a result the developing larvae, which makes them immune. It has been proven that the vaccine reduces the death rate by 28-30% without causing any harm to the queen bee. The vaccine was launched in the spring of 2023 and according to news it has already been successful in protecting 25 million bees.

Epithelial ovarian cancer (EOC) accounts for about 3% of all cancers among women and is second in frequency to uterine cancer. The possible anatomical locations for the origin of ovarian carcinoma have been suggested: the ovarian surface epithelium (OSE), the mesothelium covering the peritoneal cavity, and the fallopian tube epithelium. Among all, the OSE seems to be the most common site (Weidle et al., 2016). Epithelial ovarian cancer is the most common and fatal type of ovarian cancer which can be further classified into high-grade serous, low-grade serous, endometrioid, clear cell, and mucinous carcinoma. (Murali et al., 2023) High-grade serous carcinoma (HGSC) is the most common among all the subtypes and is known to be lethal too. HGSCs are believed to arise in the fallopian tube epithelium and ovarian surface epithelium is another possible origin (Otsuka & Matsuura, 2020). Low grade serous carcinoma (LGSC) is less common and fatal compared to high grade serous carcinoma. LGSC can originate de novo or arise following a serous borderline tumour (SBT).

There are many factors which might influence the outcome, such as the age at diagnosis, current smokers, higher body mass index, mutational susceptibility level, hormonal receptors' expression, and Ki-67 proliferation index (Babaier et al., 2022). Ovarian clear cell carcinoma (OCCC) is a special pathological type of epithelial ovarian carcinoma (EOC) and has a high frequency in Asia without a specific molecular subtype classification. Endometriosis is a recognized precancerous lesion that carries 3-fold increased risk of OCCC. (Zhu et al., 2021) Endometriosis lesions are clones of certain cells, with different qualities such as aromatase activity and progesterone resistance. The sequential growth in the particular environment of the peritoneal cavity is related with angiogenesis, inflammation, immunologic changes, and bleeding in the lesions causing fibrosis. (Koninckx et al., 2021) Primary mucinous ovarian carcinomas are a rarely occurring tumour type, accounting for less than 3% of epithelial ovarian carcinomas. MOC is identified by mucus that is mainly composed of mucin in the cystic cavity. It has shown very poor response to standard platinum-based chemotherapy regimes and PARPi-based maintenance treatment, resulting in short survival and poor prognosis in advanced-disease patients. (Wang et al., 2023).

The early detection of epithelial ovarian cancer is difficult as there are no reliable tumour markers and detectable clinical symptoms until it has reached a critical stage. (Rosen et al., 2009) With a lower survival rate the major cause for this is due to therapy resistant metastasis. Even though it is well understood that metastasis is the major cause for the progression its yet to be completely explored. (Yeung et al., 2015) Ovarian epithelial carcinomas show some features that seem to stop the working of chemotherapy. One of these is the tumour microenvironment, made of stromal cells, the extracellular matrix component (EMC) and exosomes (small extracellular vesicles loaded with molecules), creates an autocrine-paracrine communication circuit that supports invasion and cancer cell metastasis via reciprocal signalling. (Luo et al., 2016). Secondly, ovarian carcinomas exhibit intratumoral heterogeneity as is often the case with malignancies. Lastly, chemotherapy resistant tumour cells derived from ascites of patients with ovarian cancer are highly tumorigenic in mice and often exhibit stem cell-like characteristics. (Weidle et al., 2016). There are no standardised screening tests for ovarian cancer and with the diagnosis most often taking place in the late stages, recurrence is high in the population. Early identification can range from guessing the vague symptoms associated with the cancer to prophylactic surgical removal of at-risk tissue. The standard treatment followed for ovarian cancer is surgery and combination chemotherapy. Although many advances are happening in the field, ovarian cancer remains the most fatal gynecologic cancer. Taking the above points into consideration, a major key to prevention is to educate women and health care providers about the various risk factors, signs and symptoms to curtail the spread of ovarian cancers. (Stewart et al., 2019)

# CASE STUDIES IN SCIENTIFIC ETHICS: DR. HWANG WOO-SUK FROM KOREA AND DR. HE JIANKUI FROM CHINA

Vikash Mohanty (221BCZ19)

Cloning of human cell lines has always been a controversial topic due to ethical reasons. This article examines two case studies, one involving Dr. Hwang Woo-Suk from Korea and the other, Dr. He Jiankui from China. These are examples of scientists who made headlines not for their scientific achievements, but for the ethical controversies that followed.

## The Case of Dr. Hwang Woo-Suk: Cloning Scandal in South Korea

Dr. Hwang Woo Suk gained international fame because of his research in the field of stem cell research. He claimed to have successfully cloned human embryos and derived stem cells from them, gaining fame around the world as this could revolutionize the field of medical science and making personalized tissue transplant a reality.

In 2004 and 2005, Dr. Hwang published papers in prestigious journals, including *Science*, claiming he had successfully cloned human embryos and extracted stem cells. These claims captured the attention of the scientific community and the public, with hopes that his research would lead to new treatments for debilitating diseases. However, by 2006, Dr. Hwang's work was exposed as fraudulent, leading to a major scandal. He claimed to have produced 11 patient specific stem cells lines but unfortunately upon investigation it turned out to be a huge lie. He had to undergo a trial for three reasons – firstly, falsification of data, as most of his test findings and results were fabricated just to gain media attention. Secondly, the unethical collection of human eggs. It was found that he coerced his junior researchers into donating human eggs for his experimentation, which violated ethical norms. Finally, for misleading the entire scientific community by creating false expectations among the masses that he could now cure those who were in desperate need of stem cell transplants. As a result of this, his license was revoked and he was given a prison sentence of two years but more than him it affected the country of South Korea as the public lost confidence in scientific research. Globally, it damaged the reputation of South Korea. This scandal also led to reevaluation of ethical standards emphasizing more transparency, accountability and respect for human rights.

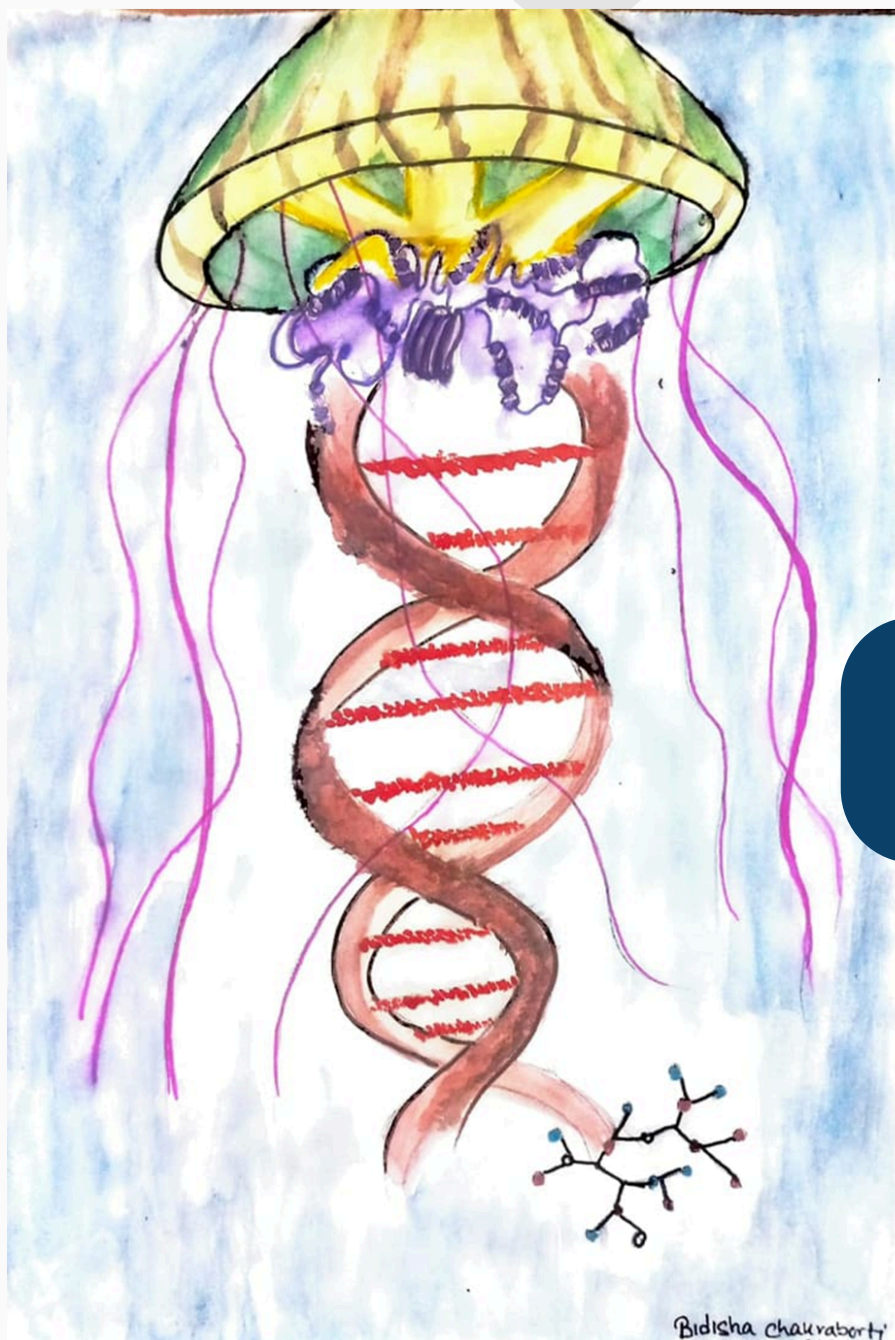
## The Case of Dr. He Jiankui: Gene Editing Controversy in China

Dr. He Jiankui, a Chinese biophysicist, made headlines in 2018 when he announced that he had edited the genomes of twin girls using the CRISPR-Cas9 gene-editing technique. His goal was to make the twins resistant to HIV infection by disabling the CCR5 gene, which the HIV virus uses to enter cells. This announcement shocked the scientific community as he tested it on human embryos and kept the authorities in the dark until the children were born.

Dr. He's work was seen as a significant overstep in human gene editing, potentially opening the door to "designer babies" and eugenics. His experimentation lacked regulatory approval, as CRISPR-Cas9 is a relatively new technique, so it has many risks and uncertainties. People also questioned whether the parents of the twins were fully aware of the risks and consequences of the process.

This led to international outrage as people emphasized that there should be strict guidelines in human gene editing. This has also led to changes made in the international regulations and guidelines for gene editing. As a result of his unethical actions, Dr. He was arrested by Chinese authorities and was given a three-year prison sentence for illegal medical practices.

The cases of Dr. Hwang Woo-Suk and Dr. He Jiankui highlight the potential dangers of unethical scientific practices. While both scientists pursued groundbreaking research, their actions crossed ethical boundaries, leading to significant consequences for themselves, the scientific community, and society at large. As technology continues to advance, it is crucial to establish clear ethical guidelines and ensure rigorous oversight to prevent similar controversies in the future.

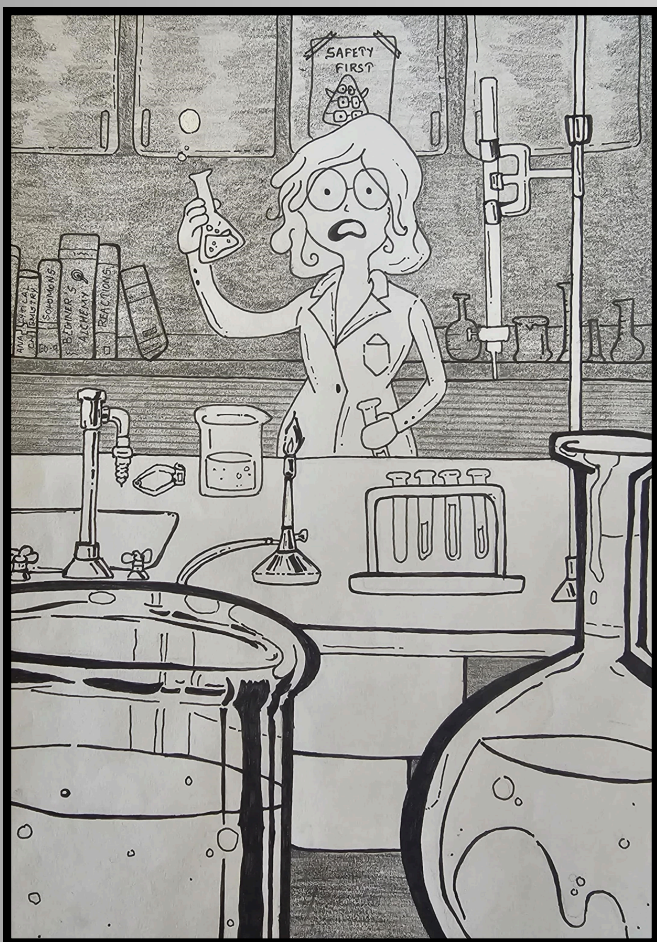


**BIDISHA  
CHAKRABORTY**  
(221BCMB23)

# STUDENTS' CONTRIBUTIONS

# FIRST YEAR STUDENTS

**ART BY LITRICIA OJ (231BCMB20)**



POEM BY

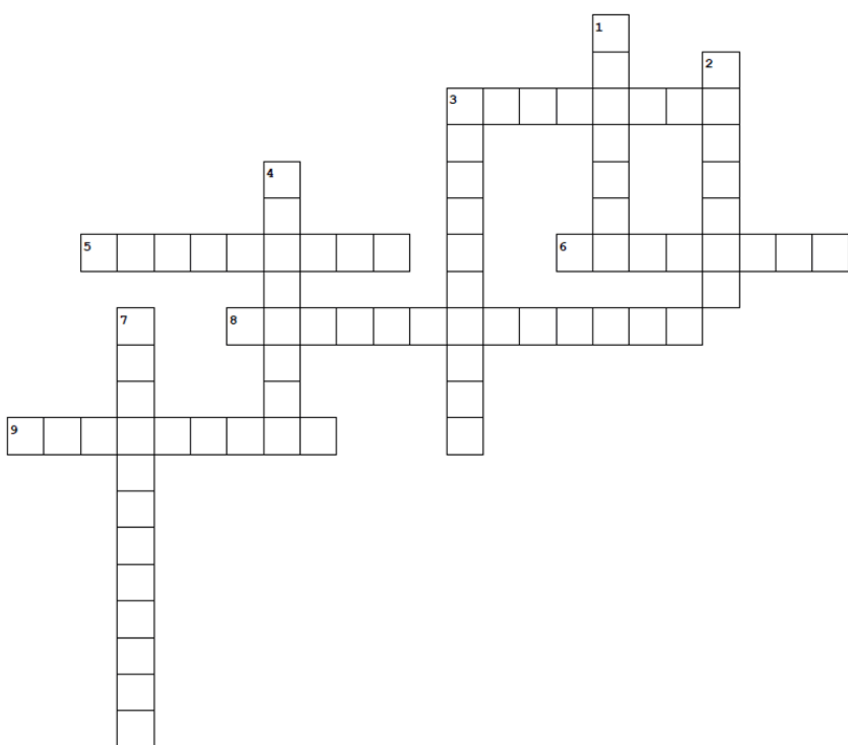
**RAKSHA PRADEEP (231BCZ18)**

## EARTH IS A LAB?

To know the life  
 The life that breathes in you and me  
 With a sigh.  
 Tracing the footprints  
 Of the oldest trials and errors.  
 Only to know the truth  
 Of what we are today  
 Is just a circle of time!  
 And the earth is once again afresh...  
 Everything in nature's pockets.  
 Not to be stolen, but to be only distributed.  
 The chemistry of life.  
 The chemistry of kindness.  
 The chemistry of brotherhood  
 Is all that matters.  
 Because we are all the same deep down!



**Crossword Puzzle by Neha Gupta (231BCMB12)**



## ACROSS

3. The attraction between like molecules
5. Macrocyclic tetrapyrrolic structure present in chlorophyll
6. Enzyme that degrades protein
8. 39 residue hormone of anterior pituitary gland
9. Amino acid with imidazole ring

## DOWN

1. Who discovered Rabies vaccine
2. Biological molecules that speed up chemical reaction in cells
3. Cancer causing agent
4. Found only in animals, a method of storing excess food
7. DNA → RNA → PROTEIN



# NAVIGATING RADIATION: HOW CAN WE PROTECT OURSELVES THIS SUMMER?

POOJA C. (23BCBT11)

Ionizing radiation is a form of energy that can remove electrons from an atom. These radiations can travel unseen and pass through our body. These radiations can cause issues in the structure of the DNA, such as altering molecules within the cells of our body and cause eventual harm. These issues can vary from skin or tissue damage to cancer.

How can ionizing radiations affect cells? These radiations interact with cells, causing damage to the cells and genetic material (DNA or deoxyribonucleic acid). The cells try to repair themselves but in case they fail to do so adequately, it would prevent the DNA from replicating correctly. This damage could result in harmful mutations in the DNA or cause death of the cell.

The changes in DNA could be from changing the chemical structure of the bases, breaking of the hydrogen bonds being connected to the base pairs or the breaking of the sugar-phosphate backbone. Applying sunscreen can help to some extent as they can limit the UV radiations from being absorbed by the skin. The best we can do is to cover ourselves, to limit the exposure to the sun or staying indoors whenever possible.

## DYNAMICS OF LIFE (POEM)

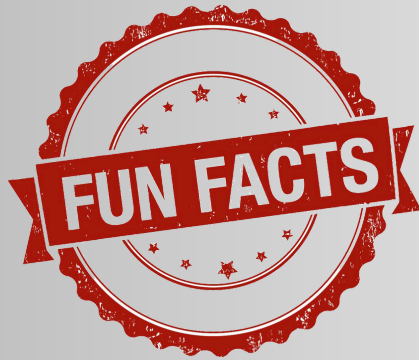
by

Krisa Ros Prince  
(231BCMB17)

Life should be in Equilibrium,  
Even when it is Entropy around you.  
Let your kindness be Exothermic &  
Your anger and jealousy Endothermic.  
Don't let your problems mess with your system,  
At all times, drive towards stability.  
Be an enzyme of your own,  
Let no one else catalyze your happiness.  
Let love be titrated in your hearts  
Against hate and persecution.  
Like the molecules inside your body,  
Work hard to keep yourself going.



# DID YOU KNOW?



**BY M. JUWARIYA**  
**231BCMB23**

1. 'J' is the only letter which is not found in the periodic table.
2. Every hydrogen atom in your body is likely to be 13.5 billion years old because it was created at the birth of the universe.
3. The smell of freshly cut grass is due to a compound called cis-3-hexenal, which is released when grass is damaged. This compound is also responsible for the distinctive aroma of green leaves and certain fruits like apples and oranges.
4. If you were to unwind all the DNA molecules in your body and stretch them out end to end, they would reach the sun and back multiple times. This highlights the incredible length of the DNA molecules contained within each cell.
5. Helium has the ability to work against gravity. When helium is cooled to near-absolute zero temperatures (-460 degrees Fahrenheit or -273 degrees Celsius), it becomes a superfluid, which means it can flow without friction.
6. Some lipstick contains lead acetate or sugar of lead. This toxic lead compound makes the lipstick taste sweet.
7. Did you know that pearls, bones, and teeth dissolve in vinegar, which contains acetic acid, a weak acid?
8. Lemons have more sugar than strawberries.



# WORD SEARCH GRID

ALL WE NEED IS CHEMISTRY

- DEBOSHREE DATTA (231BCZ02)  
- MALVIKA M. NAIR (231BCZ08)

U	E	M	N	M	S	Z	N	G	S	I	L	F	L	C
D	N	C	E	N	R	O	R	L	I	Z	Y	L	G	I
E	A	S	U	T	R	M	A	C	I	D	I	T	Y	M
F	N	T	G	O	A	T	E	C	A	R	B	O	N	E
S	T	E	B	K	I	B	M	S	E	R	E	L	N	C
C	I	R	S	B	R	O	O	L	A	C	N	Y	P	A
I	O	E	R	E	N	K	F	L	G	B	J	H	L	R
T	M	O	R	C	D	S	W	H	I	E	H	C	J	C
E	E	M	E	Z	O	I	A	O	C	S	O	R	N	H
N	R	E	F	M	N	V	L	V	M	H	M	W	N	H
I	S	R	W	W	C	I	A	A	O	E	A	Y	T	U
K	U	S	W	B	E	A	N	L	H	S	R	E	W	F
Y	T	I	S	O	C	S	I	V	E	H	E	V	I	N
I	E	V	Q	B	N	A	O	Q	L	N	B	G	N	Q
N	I	B	O	L	G	O	M	E	A	H	T	F	Z	Q

**Instructions for the crossword puzzle below:** Each across and down clue is assigned a unique number. This number corresponds to the number for its answer in the grid. Answers must fit within the allotted space given for the clue.

## CROSSWORD PUZZLE

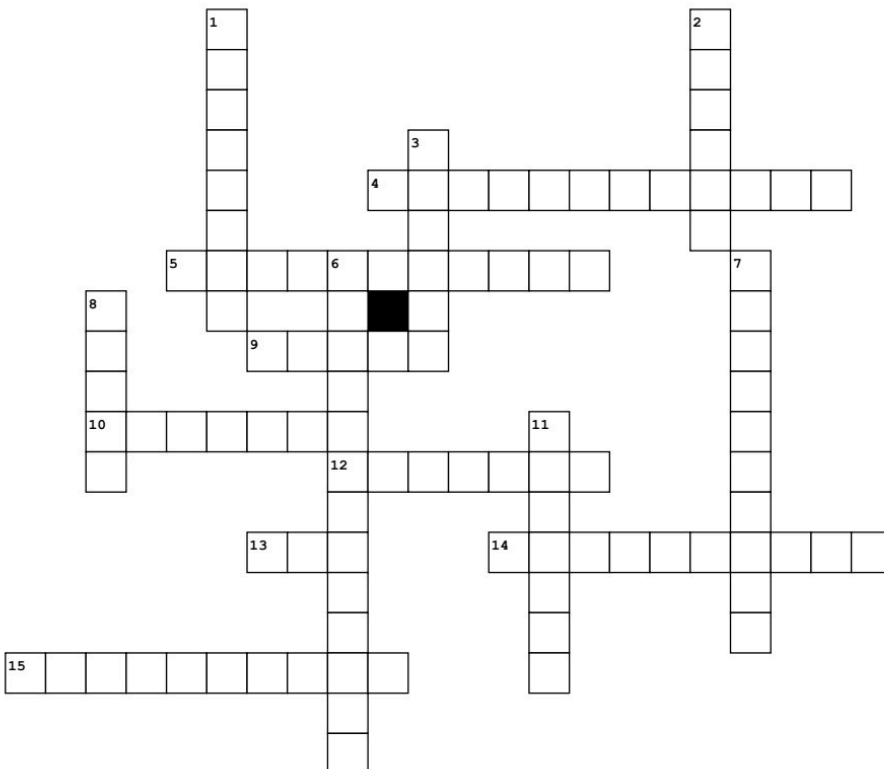
CREATED BY;  
LISA REX (231BCZ01)

### ACROSS

- 4. SITE OF AEROBIC RESPIRATION IN EUKARYOTIC CELLS
- 5. NON SUPERPOSABLE MIRROR IMAGES
- 9. PROPORTION BETWEEN TWO SETS OF DIMENSIONS
- 10. BIOLOGICAL CATALYST
- 12. ASEXUAL CHLAMYDOSPORE
- 13. WAVEFUNCTION OF ELECTRON
- 14. TRANSFER OF HEAT
- 15. BREAKDOWN OF GLUCOSE

### DOWN

- 1. PROTONS PLUS NEUTRONS
- 2. FOUND IN THE ADIPOSE TISSUES
- 3. KETOPENTOSE
- 6. COPYING DNA TO RNA
- 7. ENZYMES BIND TO (PLURAL)
- 8. SHIP OF THE DESERT





# READER INTERACTIVE PUZZLE : FORENSIC PUZZLE

BY SOORAJ SUNIL NAIR (231BCZ13)

## "DEADLY INHERITANCE: A MURDER MYSTERY"

### Introduction:

As a forensic scientist, you're tasked with solving the mysterious case of the Blackwood family.

### Objective:

Unravel the murder mystery of Alexander Blackwood through scientific deduction and critical thinking.

### Characters:

- A. Richard Blackwood: Father and car mechanic.
- B. Anna Blackwood: Mother and retired university chemistry professor.
- C. Alexander Blackwood (Victim): Eldest twin.
- D. Emily Blackwood: Youngest child studying undergraduate organic chemistry.
- E. William Blackwood: Twin brother suffering from Hemophilia B.

### Crime Scene:

Alexander was found dead in his room with no blood stains and with traces of vomit on the floor. An empty bottle labeled "Factor IX" injection, containing ethylene glycol, was discovered in the dustbin.

### Storyline:


Richard claimed to be at work during the incident and had a dispute with Alexander over inheritance. Anna heard a noise from Alexander's room before finding that he had collapsed. Emily claims that she was at college, while William heard the noise and saw Emily in the garage earlier.

### Puzzle:

- 1.H\_m\_ph\_L\_a  
{HINT- Disorder causing improper blood clotting.}
- 2.l\_he\_ita\_c\_  
{HINT- Passage of hemophilia B gene in families.}
- 3.\_ar\_ie\_  
{HINT- Individual with hemophilia gene but no symptoms.}
- 4.F\_ct\_r IX  
{HINT- Injection for clotting factor replacement.}
- 5.\_ - Chromosome  
{HINT- Chromosome carrying the hemophilia B gene.}
- 6.Gl\_c\_L\_c a\_id  
{HINT- Toxic metabolite from antifreeze poisoning.}
- 7.Et\_yL\_n\_gL\_c\_l  
{HINT- Antifreeze found in garages.}

**Clues:**

Emily's diary entry mentions antifreeze. On laboratory testing of Alexander's blood sample, you find a very high concentration of glycolic acid in his blood. You also find out that Factor IX injection had been stored in the refrigerator. The family explains to you that since William had Hemophilia B, he was instructed to take Factor IX injection as part of his treatment process. Hemophilia B is X-linked recessive, inherited from the mother. Factor IX injection bottle suggests that Alexander's self-diagnosis was a misconception, since his brother had Hemophilia B, not him. Using these clues, you can deduce the murderer.



## Expanding Our knowledge on the black plague using microbiological and biochemical techniques

SUHOTRA  
DAS  
(231BCBT08)

### ABSTRACT

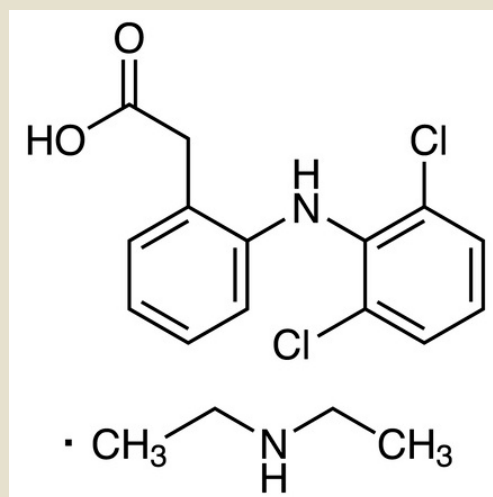
Paleopathology is defined as the study of ancient diseases in humans and animals recovered from archaeological sites, using microbiological and biochemical techniques. The techniques are DNA analysis, radiography, isotopic analysis and macroscopic examination. The black plague is one of the most commonly known and researched epidemics in the history of mankind. In the journal club which was held on 15-03-24, we discussed about the substantial evidence which were found from that time period, including mass burial sites, characteristic lesions on skeletal remains, DNA and isotopic analysis of remains from that period. Using the knowledge of biochemistry, we can construct the complete timeline of what actually had happened during that time period. We also took the help of literary sources from that period to improve our understanding.

# THE MODERN 'ASHWAGANDHA'

SUHOTRA DAS (231BCBT08)

People who have interest in mythology might have heard of 'ashwagandha' and must be wondering what it is. I too wondered about it and recently, I found out that it is a type of pain reliever. This further deepened my curiosity about what can be a modern equivalent of ashwagandha, and the pain-relief gel Volini immediately stuck out to me. Volini is actually the commercial name; its components and their respective functions are as follows:

1. Diclofenac diethylamine :- numbs pain
2. Methyl salicylate :- Reduces swelling
3. Menthol :- Analgesic
4. Linseed oil :- Produces a cooling sensation



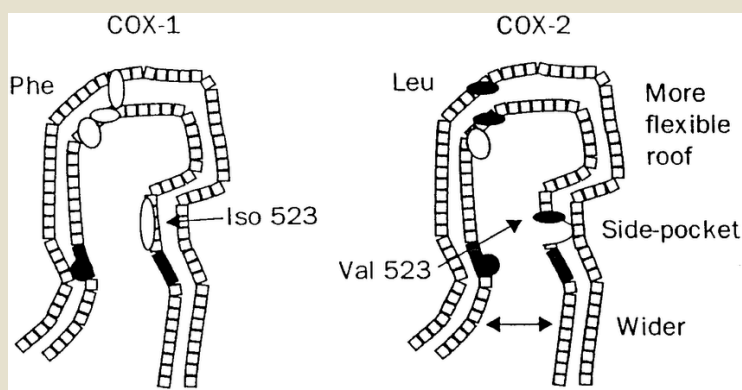
**Fig.1. Diclofenac diethylamine**

The mechanism of Volini, a topical medication containing NSAID (Non-steroidal anti-inflammatory drugs), is that it gets absorbed through the skin in a process termed as transdermal absorption. In this process, the molecules present in the medication move from an area of higher concentration (the topical application site) to an area of lower concentration (the bloodstream) across the skin layers. The action of these compounds reduces inflammation, pain, and fever. Diclofenac blocks the enzymes called cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2), which are involved in producing substances that cause inflammation and pain. Diclofenac mainly inhibits COX-2, which is more active during tissue damage and inflammation. However, it also affects COX-1, which is important for normal bodily functions such as protection of the stomach lining. By blocking these enzymes, diclofenac reduces the production of inflammatory substances like prostaglandins and thromboxanes.

COX-1 is an enzyme that is constitutively expressed throughout the body and is involved in maintaining normal platelet function, regulating blood flow in the kidneys, and safeguarding the stomach lining from harmful acidity. In contrast, COX-2 is an enzyme that becomes more abundant during tissue damage and inflammation, contributing to pain sensation. Diclofenac primarily inhibits COX-2, particularly in inflamed tissues like those found in joints.

However, its inhibition of COX enzymes in other areas, such as the stomach, can reduce the production of protective substances and potentially lead to gastric irritation. Diclofenac alleviates pain by reducing the sensitivity of peripheral pain receptors, via activation of ATP-sensitive potassium channels and stimulation of the L-arginine nitric oxide cGMP pathway. Additionally, it decreases the levels of substance P, a neuropeptide associated with inflammation and pain, in the synovial fluid of rheumatoid arthritis patients. Moreover, it may help treat skin conditions like actinic keratosis by hindering the production of substances that promote abnormal cell growth.

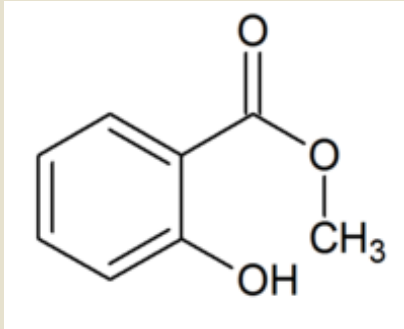
**Fig.2. Comparison between the active sites of COX1 and COX2 enzymes**



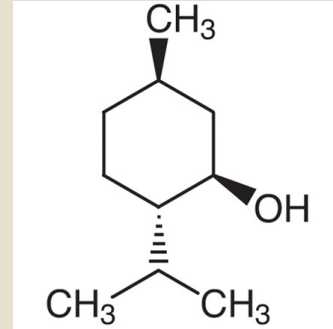
Diclofenac alleviates pain by reducing the sensitivity of peripheral pain receptors, likely achieved through activating ATP-sensitive potassium channels and stimulating the L-arginine nitric oxide cGMP pathway. Additionally, it decreases the levels of substance P, a neuropeptide associated with inflammation and pain, in the synovial fluid of rheumatoid arthritis patients. Additionally, it may help treat skin conditions like actinic keratosis by hindering the production of substances that promote abnormal cell growth. Methyl salicylate reduces swelling by inhibiting the production of prostaglandins, which promote inflammation. It also causes vasodilation and increases blood flow to the affected area, thereby removing excess fluid and inflammatory mediators. This concomitantly reduces swelling and edema.

Menthol activates a receptor called TRPM8 (Transient Receptor Potential Melastatin 8), which is a type of ion channel found on sensory nerve endings. TRPM8 is known as the "cold receptor" because it is activated by cool temperatures. When menthol binds to TRPM8, it triggers the opening of the ion channel, allowing calcium and other ions to flow into the nerve cell. The influx of calcium ions into the sensory nerve cell leads to changes in its electrical activity. This altered signaling affects the transmission of pain signals along the nerves. Menthol-induced activation of TRPM8 can inhibit the transmission of pain signals by hyperpolarizing the nerve cell membrane or by interfering with the release of neurotransmitters involved in pain signaling, such as substance P. Methyl salicylate reduces swelling by inhibiting the production of prostaglandins which promote inflammation. It also causes vasodilation increasing blood flow to the affected area by removing excess fluid and inflammatory mediators, thus reducing swelling.

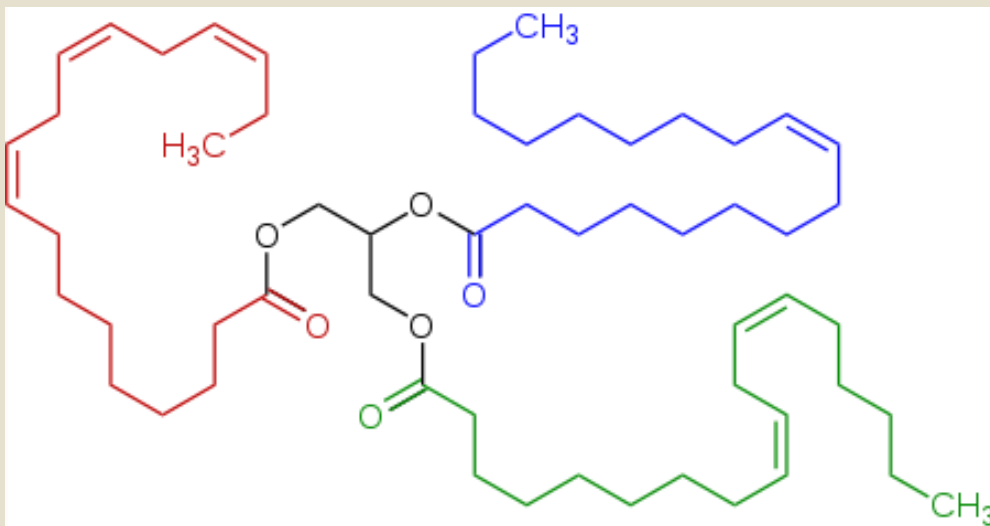
Linseed oil, extracted from flaxseeds, is primarily composed of polyunsaturated fatty acids, particularly alpha-linolenic acid (ALA), an omega-3 fatty acid. It forms a thin layer that can help trap moisture. As this moisture evaporates from the skin's surface, it can produce a cooling effect. This mechanism is similar to how sweat cools the body through evaporative cooling. This is basically how all the four main components of 'Volini' work together to relief our aching body parts. ALA can bind to COX active site and prevent the cyclooxygenation of arachidonic acid and other omega-6 fatty acid substrates of COX enzymes. This can further slow down the formation of pro-inflammatory agents which are formed by the action of COX enzymes.



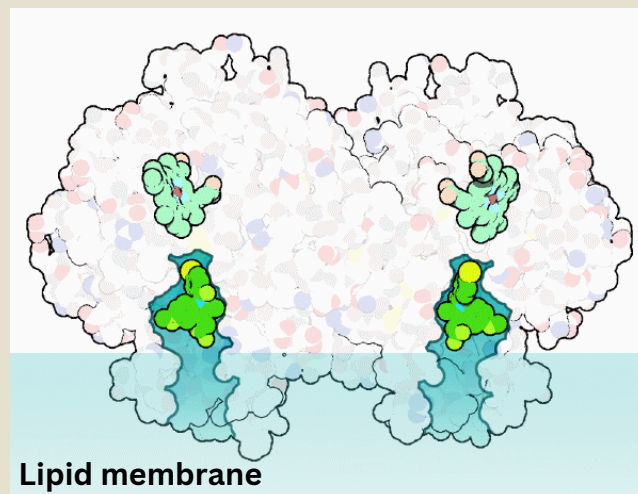
**Fig.3. Methyl salicylate**



**Fig.4. Menthol**




**Fig.5. A triglyceride found in linseed oil**



**Lipid membrane**

**Fig.6. Cartoon showing the structure of COX enzyme dimer and its hydrophobic active site cavity**





Throughout the rivers flowing I stand tall,  
A tree amidst the current's thrall.  
With leaves that rustle, whispering tales,  
Of squirrels' antics and nightingales.

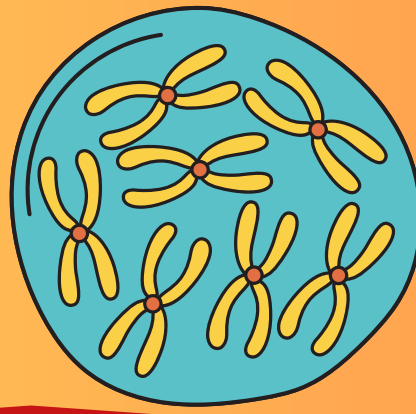
My bark, weathered, tells stories untold,  
Of seasons passing, both warm and cold.  
Roots dig deep, anchoring me tight,  
In nature's dance, I find delight.

The sun's warm embrace, the rain's cool kiss,  
Nature's gifts I never want to miss.  
For in this world of greens and blues,  
I find my joy, my refuge, my muse.

Amidst the chaos, I remain,  
A steadfast symbol, through wind and rain.  
So stand tall, my fellow tree,  
For in your strength, the world will see.

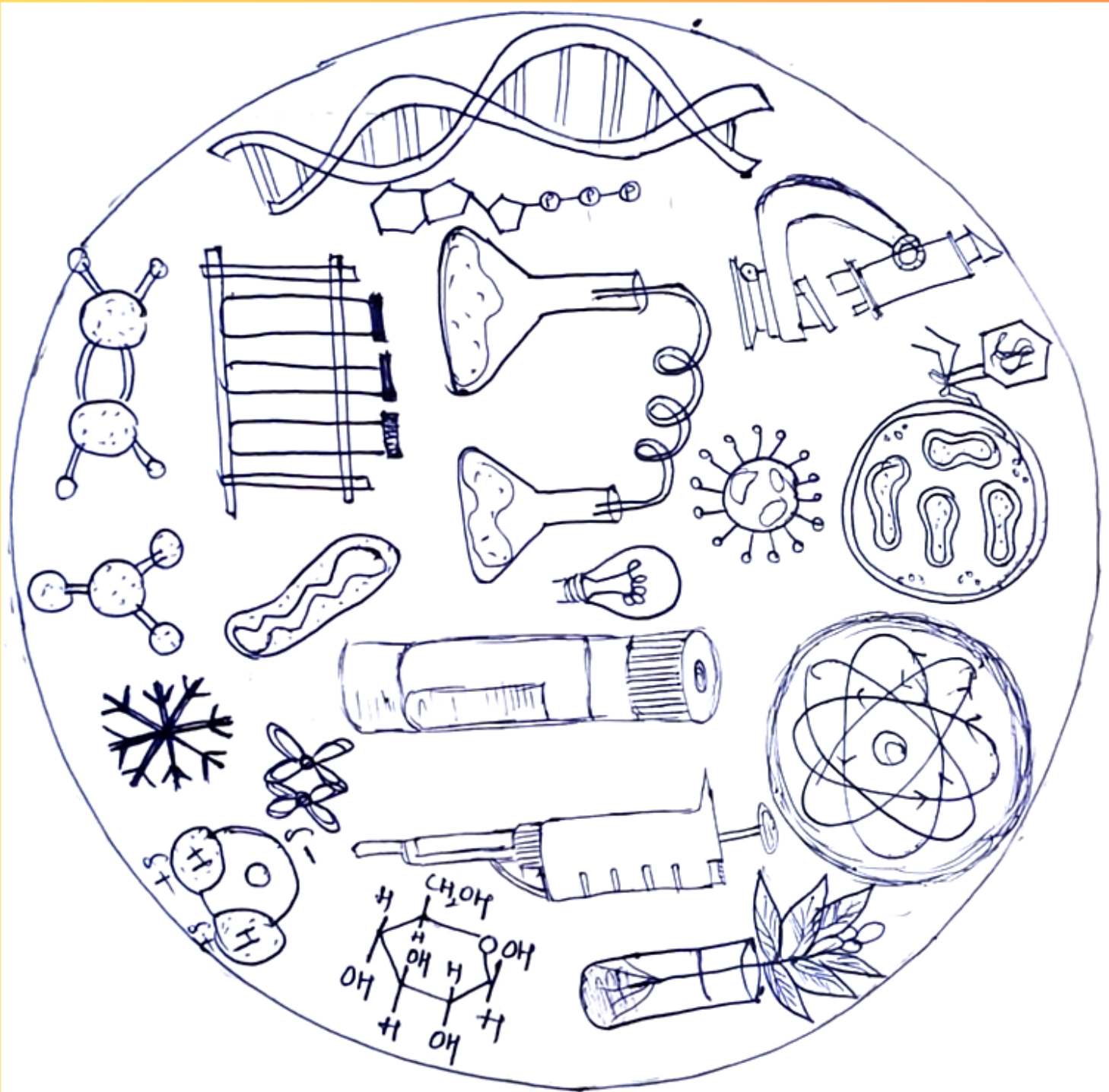
Though storms may rage and winds may blow,  
Your roots run deep, your branches grow.  
So stand proud, you are strong,  
In nature's chorus, you belong.

**Abraham R Dudeja  
(231BCBT10)**

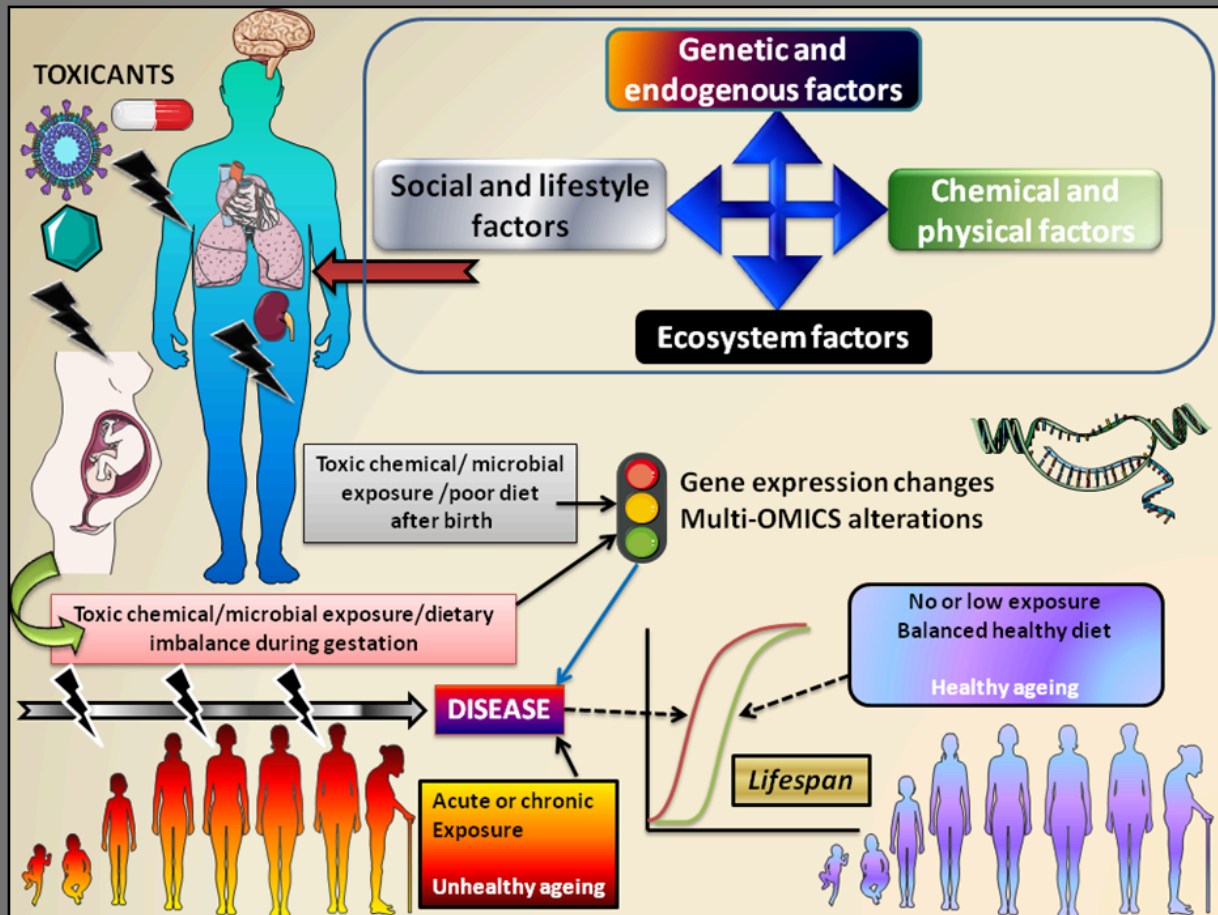


# A Biochemistry Artwork

by Dr. Shraddha K.N.



Dr. Daniel Andrew M. Gideon



In an attempt to write a review article on the exposome concept, I made this image a year ago to explain the exposome concept. Sadly, since I did not pursue writing the article with passion, I haven't progressed much. There are several omics fields that you may have heard about - genomics, proteomics, metabolomics, interactomics and phenomics. However, you may not have come across the term 'exposomics' or 'exposome'. The word 'exposome' was first coined in 2005 by Dr. Christopher P. Wild. The idea is that a complex interplay of isolated factors - genetic & endogenous factors, social & lifestyle factors, chemical & physical factors and ecosystem/ecological factors can cumulatively influence human health and longevity. Analytical chemistry has been tremendously useful in determining the presence of pollutants and toxic substances in both our environment and in our body fluids. We have also been able to unravel the influence of the 'exposome' on an individual's health and lifespan using sensitive analytical chemistry methods. From the moment of conception to birth and all the way through adulthood, humans are constantly exposed to their environment around them. Other than the genetic and social factors that we grapple with, we are exposed to toxic substances in our environment - the food we eat, medications we take, the water that we drink, and the air that we breathe. The contrast between healthy ageing and unhealthy ageing in two different individuals could be because of differences in the exposome and intrinsic / individual-specific factors such as genetics. In the past decade, over 40,000 articles related to exposome concept have been published. There is an unprecedented rise in cancer diagnosis rates; not many of us can see what is in our food or drink and none of us has mass or UV-visible spectrometers lying around at home. It is very difficult for the body to get rid of some chemicals which can stay in our system for decades of years. Mankind needs to stop polluting soil and water and formulate strategies to make the world a better place for living.



# Riddle Time

## Riddle – me – ree – who am I?

By  
**Dr. Sandra Misquith**

1. Symbolically not in silver but definitely in gold.  
My discovery helped elucidate biochemical processes so I am told.  
Who am I?
2. I am in the air, I am everywhere.  
Sadly too much of me is bad, so beware! Who am I?
3. I glitter, I shine but I am not gold.  
Stop fooling around and do as you are told! Who am I?
4. You'll find me in plenty in milk and in bones.  
the origin of my name I share with Gods of old. Who am I?
5. Though I am sweet, when there's wind in my sails – energy is high.  
I flip I flop I crash on my couch, energy is lowered – I sigh! Who am I?
6. Half my name is “good” in French  
Just rally around and avoid falling in the trench! Who am I?
7. Temperatures rise quickly so I can tell  
A glass of me will kill not quell! Who am I?
8. Beautiful structures - Oh maybe I am not,  
But I sure can insulate you from quite a lot! Who am I?
9. Like a caged bird I float on the sea. Cholesterol excites me but  
glucose is sweet. A lot of life's processes depend on me! Who am I?
10. I haven't got a side chain, I'm unique but very plain.  
With my buddy glutamate, I'm active in the brain. Who am I?

## I. OVERVIEW

The department of Biochemistry was established by stalwarts in the field in 2020. Although it still is a relatively new department, it is growing rapidly and is contributing to the growth of our esteemed Institution. The UG course that is currently being offered by the department is one of the most sought after courses every year during admissions. Students who passed out from the BBZ course in 2023 gave very positive feedback about the syllabus and teaching & evaluation by the faculty members of the department. Our department is gearing up to commence the master's programme in Biochemistry very soon. The following is the report showcasing the staff & student achievements and events organized by the Biochemical Society and the department in the academic year 2023-2024.



**A photograph taken after a BoS meeting in December 2022; Left to right:** Biochemistry teachers Dr. Shraddha and Dr. Daniel with Mr. Anup, external subject expert, Dr. Devaraj (Bangalore University), Dr. Sandra Misquith (HoD), Dr. Sarada from NIMHANS, Dr. Mohandas (CoE) and the then Dean, Dr. Shobha. This is one of the greatest memories as this BoS meeting was held to pass the SJU (NEP) syllabus.

## II. FACULTY ACHIEVEMENTS in 2023-2024

### 1. Dr .Sangita Das

- was selected for the prestigious SJU Dedicated Research Faculty Scheme. She assumed duty under this scheme on 1st October 2023.
- has crossed a new landmark of 1700 citations to her research work on Google Scholar (h-index of 21 and i-10 index of 27).
- edited a book titled “Organic and Inorganic Materials Based Sensors”, which has 3 Volumes. ISBN: 978-3-527-34955-5, Published by Wiley-VCH GmbH. This is the first book publication that was edited by a staff member of the Biochemistry department.

### 2. Dr. Daniel Andrew M. Gideon

- published a paper in the journal *Molecules*, MDPI as a coauthor in October 2023. [DOI:10.3390/molecules28207101](https://doi.org/10.3390/molecules28207101)
- published three book chapters in: Phospholipases in physiology and pathology (Ed. Prof. Sajal Chakraborti), Academic Press, Elsevier as the Corresponding author.
- was a Resource Person for an online workshop - “Tactful techniques to enhance article writing”. The programme was jointly organized by Tamil Nadu Association of Intellectuals and Faculty (TAIF) and GRABS Educational Charitable Trust on September 20, 2023 between 6 PM and 8 PM.
- was confirmed as a dedicated research faculty since January 2024.
- published a review paper as a co-author in *American Institute of Physics: Advances* in December 2023. [DOI: 10.1063/5.0171860](https://doi.org/10.1063/5.0171860)
- served as a resource person for a one-day workshop on Scientific writing at the Department of Bioinformatics, Bishop Heber College (Autonomous), Tiruchirappalli, Tamil Nadu on December 6, 2023
- served as a Guest Editor for a special issue titled “Redox control of plant metabolism and biofuel production” and published an editorial in *Frontiers in Plant Science* in July 2023. [DOI: 10.3389/fpls.2023.1244229](https://doi.org/10.3389/fpls.2023.1244229)
- successfully reviewed 30+ articles for various Biochemistry and life science journals (only WoS) in the academic year 2023-2024.

# SENSING OF DEADLY TOXIC CHEMICAL WARFARE AGENTS, NERVE AGENT SIMULANTS, AND THEIR TOXICOLOGICAL ASPECTS

*Edited by*

SANGITA DAS

*Department of Chemistry, Durham University, Durham, United Kingdom;  
Biosensor Group, KIST Europe Forschungsgesellschaft mbH, Campus, Saarbrücken, Germany*

SABU THOMAS

*International and Inter University Centre for Nanoscience and Nanotechnology, Mahatma Gandhi University,  
Kottayam, Kerala, India*

PARTHA PRATIM DAS

*Center for Novel States of Complex Materials Research, Seoul National University Seoul, Republic of Korea*



**Dr. Sangita Das edited a textbook and she shares her joy with us on this momentous achievement**

Furthermore, the book discusses cutting-edge technologies like smart fabric sensors, biodegradable electronics, and nanomaterial-based transistors. Additionally, this book encompasses the details about organic-inorganic sensors. Fiber-optic pH sensors and organic thin film transistor strain gauges are made for biomedical uses. It also talks about OTFT infrared sensors for touchless human-machine interactions. It goes into organic light-emitting diode-biosensing platforms, capturing images using organic sensors, solid-state sensors, organic gas sensors, and electronic noses.

A recently published book entitled "Organic and Inorganic Materials Based Sensors" in 3 volumes (ISBN: 978-3-527-34955-5) serves as a primary reference for researchers and academics across disciplines, from chemistry to biomedical engineering. As one of the editors and authors, I believe this work offers valuable insights into sensory devices and their applications in various fields.

The book extensively explores the development techniques for sensory devices, highlighting their practical implications. It covers a wide range of topics, including organic semiconductors, conducting polymers, and hybrid sensors, delving into advanced concepts such as guest-induced phosphorescence and mechanofluorochromic materials.

It explores electrolyte-gated organic transistors for biochemical sensing, ion-selective organic electrochemical transistors, DNA biosensors, metabolic organic sensors, and conductive polymer-based sensors. These are all used for biomedical applications.

With detailed discussions on characterization techniques and innovative sensor configurations, the book provides valuable insights into the design of efficient, reliable, and versatile sensing systems for a multitude of applications.

# BOS MEETING HELD IN MARCH 2024





**Prize  
winners**

# Student Achievements

## Congratulations!



STUDENTS OF 2ND SEMESTER B.SC BIOCHEMISTRY - GLORY, JUWARIYA, NEHA, MARION AND SNEHA WON THE **SECOND PRIZE** AT THE EVENT "BIOAURA", ORGANIZED ON JANUARY 24, 2024 BY THE DEPARTMENT OF LIFE SCIENCES, KRISTU JAYANTI COLLEGE, BENGALURU.



**Participants** - Armaan Khan, Ankita Ajith (contingent team)  
**College**- Mount Carmel College  
**Fest**- Cul-ah!  
**Event name**- Her Lab, Her Rules  
**Date**- 02-02-2024  
Won first place.



**Participants** - Varsha S J, Krishna Binesh (non-contingent team)  
**College**- Mount Carmel  
**Fest**- Cul-ah!  
**Event name**- Her Lab, Her Rules  
**Date**- 02-02-2024  
Won third place.



# International Publication by our students

S. Shivani & Sneha Bhattacharjee of 6th semester BBZ and Taanusiya Mukherjee of 4th Semester BcZ published a paper in *Journal of Biomolecular Structure and Dynamics*

(Taylor and Francis).

DOI: [10.1080/07391102.2024.2317988](https://doi.org/10.1080/07391102.2024.2317988).



## Behenic Acid as a multi-target inhibiting antibacterial phytochemical against *Vibrio parahaemolyticus* and *Aeromonas hydrophila* for effective management of aquaculture infections: an in-silico, in-vitro & in-vivo experimentation

Lokesh Ravi<sup>a</sup> , Ajith Kumar K<sup>b</sup> , Shree Kumari G R<sup>c</sup> , Jesna Mathew<sup>d</sup> , Harshitha S<sup>e</sup> , Mukti Panda<sup>e</sup> , Shivani S<sup>f</sup> , Ayona Paul<sup>g</sup> , Chandana TS<sup>d</sup> , Aswani Anil<sup>e</sup> , Megha J K<sup>c</sup> , Taanusiya Mukherjee<sup>f</sup> , Sneha Bhattacharjee<sup>f</sup> , Manu Raveendran Nair<sup>h</sup> , Subhanjan V<sup>d</sup> , Mohanasrinivasan V<sup>c</sup> and Pratishta Jain<sup>i</sup>

<sup>a</sup>Department of Food Technology, Faculty of Life and Allied Health Sciences, MS Ramaiah University of Applied Sciences, Bengaluru, Karnataka, India; <sup>b</sup>Department of Life Sciences, Kristu Jayanti College (Autonomous), Bengaluru, Karnataka, India; <sup>c</sup>School of Biosciences and Technology, Vellore Institute of Technology, Vellore, Tamil Nadu, India; <sup>d</sup>Department of Chemistry, School of Chemical Sciences, St Joseph's University, Bengaluru, Karnataka, India; <sup>e</sup>Department of Biotechnology, School of Life Sciences, St Joseph's University, Bengaluru, Karnataka, India; <sup>f</sup>Department of Biochemistry, School of Chemical Sciences, St Joseph's University, Bengaluru, Karnataka, India; <sup>g</sup>Department of Microbiology, School of Life Sciences, St Joseph's University, Bengaluru, Karnataka, India; <sup>h</sup>Department of Mathematics, School of Physical Sciences, St Joseph's University, Bengaluru, Karnataka, India; <sup>i</sup>Department of Biotechnology, Faculty of Life and Allied Health Sciences, MS Ramaiah University of Applied Sciences, Bengaluru, Karnataka, India

Communicated by Ramaswamy H. Sarma

### ABSTRACT

Multi-Target Inhibitors are the upcoming frontrunners of the antibiotic world as they provide significant advantage over drug resistance development. Antibacterial drug discovery research, requires more robust and innovative approaches such as multi-target inhibiting drugs, which over comes the innate hurdles in the field of antibiotics. In this current study, a curated set of 5,112 phytochemical molecules were virtually screened for its multi-target inhibition potential against 7 antibacterial protein drug-targets. Behenic Acid was identified to be the most significant phytochemical molecule with potential to inhibit Catalase Peroxidase (KatG), Adenylosuccinate Synthetase (ADSS) and Pyridoxine 5'-Phosphate Synthase (PdxJ), based on SeeSAR and AutoDock Vina results. Further, the inhibition potential of Behenic Acid was validated using 500 ns Molecular Dynamics (MD) Simulation based on Desmond analysis. Behenic Acid was further investigated in-vitro using agar-well-diffusion and Minimal Inhibitory Concentration (MIC) assay, where it demonstrated 20 ± 1 mm zone-of-inhibition and 50 µg/ml MIC value against both *Vibrio parahaemolyticus* and *Aeromonas hydrophila*. Zebrafish based investigations was carried to confirm the in-vivo antibacterial efficacy of Behenic Acid. It was observed that, there is a progressive dose-dependent recovery from the bacterial infection, with highest recovery and survival observed in fishes fed with 100 µg/day of Behenic Acid. Results of the in-vitro and in-vivo assays strongly support the in-silico prediction of the antibacterial activity of Behenic Acid. Based on the results presented in this study, it is concluded that, Behenic Acid is a strong multi-target antibacterial phytochemical, that exerts antagonism against aquaculture bacterial pathogens such as *V. parahaemolyticus* and *A. hydrophila*.

### ARTICLE HISTORY

Received 12 October 2023  
Accepted 7 February 2024

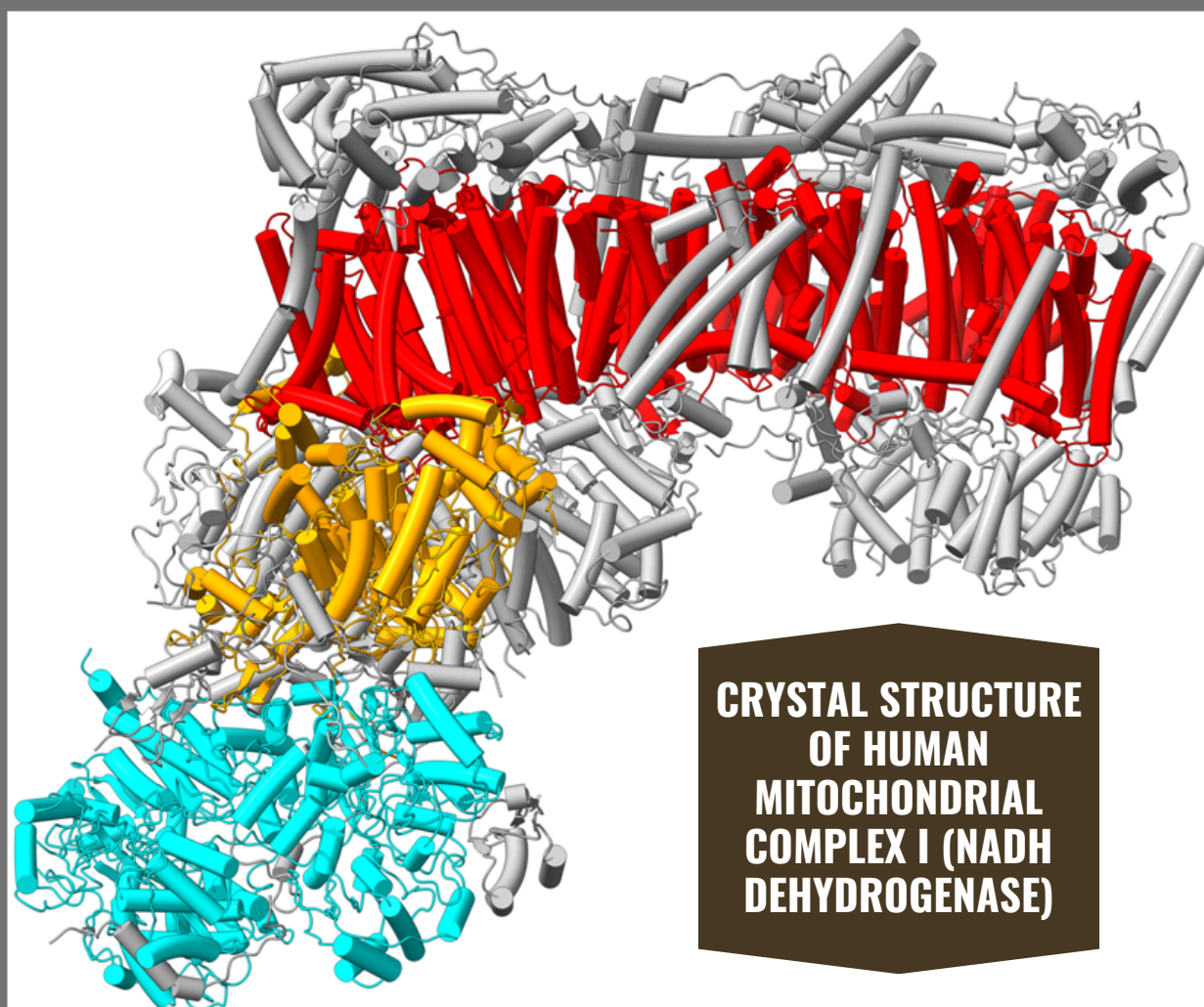
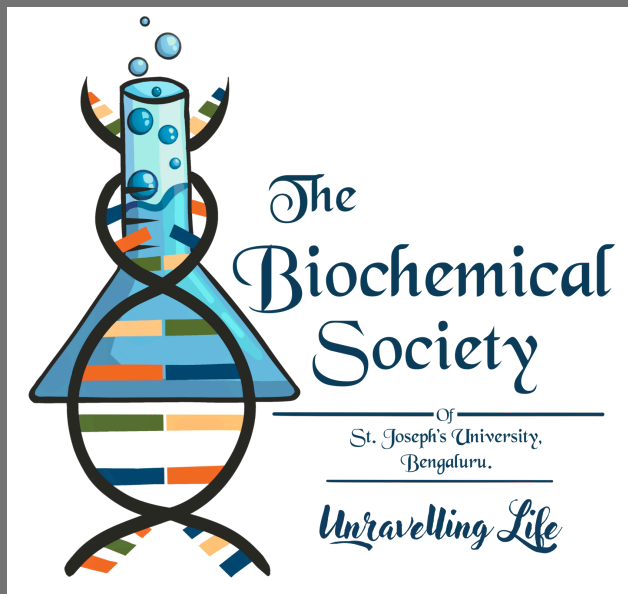
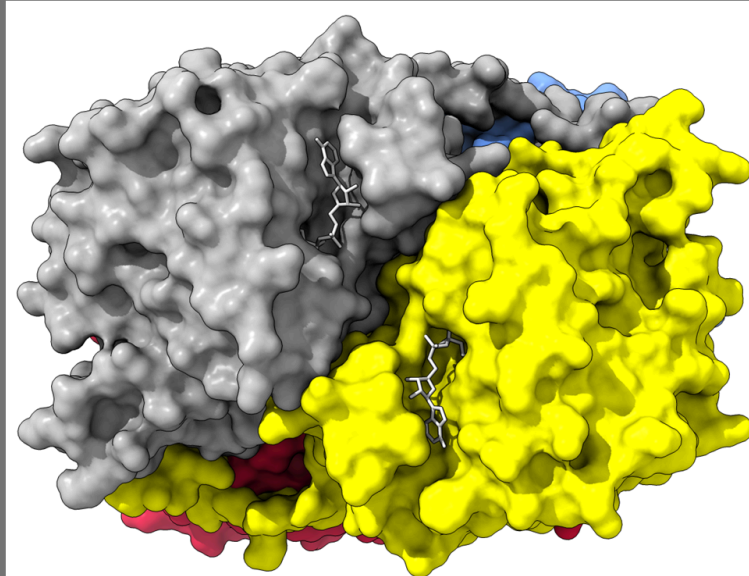
### KEYWORDS

Behenic Acid; antibacterial; phytochemical; SeeSAR; AutoDock vina; *vibrio parahaemolyticus*; *aeromonas hydrophila*

We wholeheartedly congratulate our students on their phenomenal achievement!

# DEPARTMENT ASSOCIATION REPORT 2023-2024

Structure of human LDH  
tetramer with bound NADH



# REORIENTATING THE TEACHING LEARNING PARADIGM FOR THE 21ST CENTURY CLASSROOM

## SPEAKERS



Dr. Susan Mary Philip



Ms. Rachel Stone

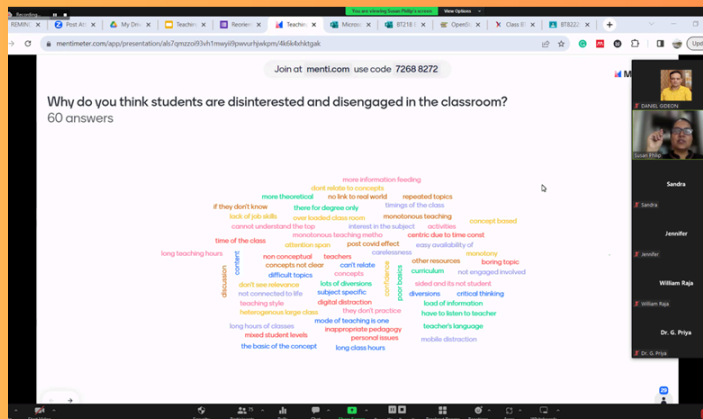


Dr. Jennifer Loertscher

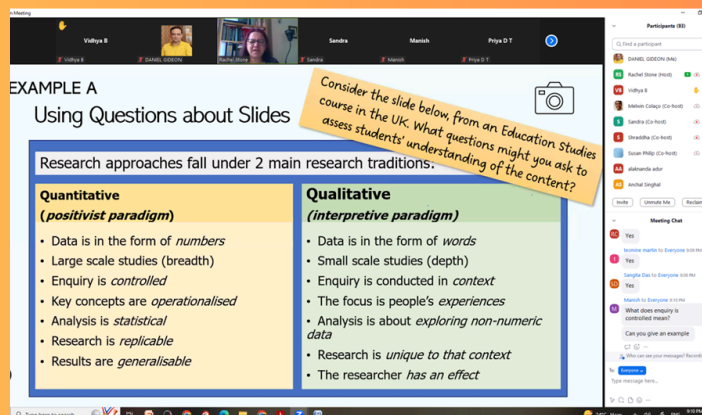
**JULY 5-7, 2023: "REOREINTATING THE TEACHING LEARNING PARADIGM FOR THE 21ST CENTURY CLASSROOM" (ONLINE WORKSHOP ON ZOOM)**



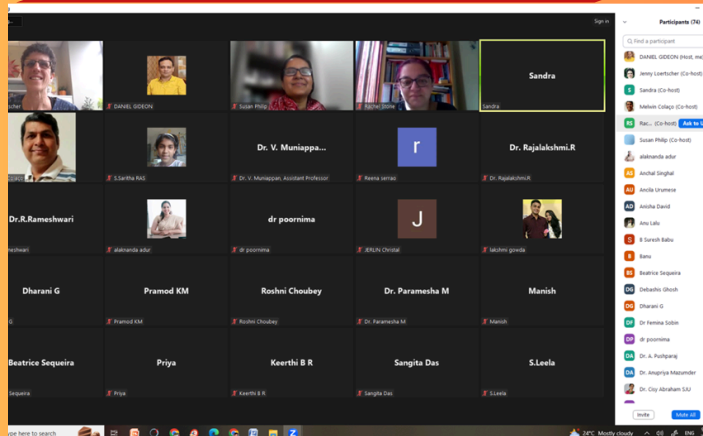
## Day 1 screenshot



## Day 2 screenshot



## Day 3 screenshot

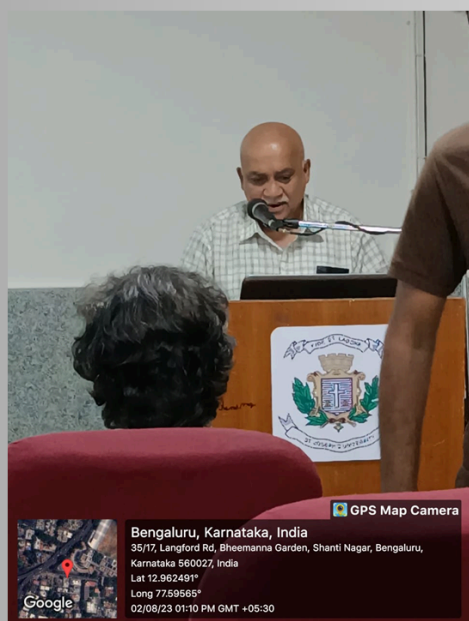


About 100 Faculty members and teachers from all levels of the education fraternity from Universities, colleges and schools all over India registered. 90 of the registered participants turned up for all three days of the workshop. Dr Susan Mary Philip (SJU), Ms Rachel Stone (Scheffield-Hallam University, UK) and Dr Jennifer Loertscher (Seattle University, Washington, USA) were the speakers. On Day 1 (July 5th 2023), Dr Sandra Misquith (HoD) gave the welcome address and introduced Dr Susan, who delivered her talk – “Enabling enquiry and self-learning in the classroom”. On Day 2, Dr Shradha introduced Ms Rachel Stone, who delivered her talk titled –“Supporting student-centric learning”. On Day 3, Dr Daniel introduced Dr Jennifer, who delivered her talk- “Connecting research with purpose: Strategies to support whole person education”. Dr Daniel offered a brief reflection of all three talks and the workshop ended with the vote of thanks by Dr Sandra.

**AUGUST 2, 2023: INVESTITURE CEREMONY OF THE BIOCHEMICAL SOCIETY AND SPECIAL GUEST LECTURE ON "GENOME EDITING" (DE NOBILI HALL, AUDITORIUM)**



This meeting organized by the Biochemical Society had a two-pronged agenda: a) Expert talk by Prof Dr. D.N. Rao on "genome editing" and b) Investiture Ceremony to formally entrust the new batch of office bearers of the Biochemical Society for the academic year 2023-2024 with their designated roles and responsibilities. The event commenced with a prayer and a reading from the Holy Bible. Dr. Sandra introduced the distinguished Speaker for the day, Prof DN Rao from IISc, who has worked extensively on nucleic acids and on genomics. Prof. Rao shared his deep insights into the Nobel Prize idea of Jennifer Doudna and Emmanuelle Charpentier, who discovered the CRISPR-Cas9 system. This modern technological discovery has ushered in new prospects for solving many genetic diseases and opened up new avenues to study genetics. After the talk, the Registrar, Dr. Melwin Colaço, conferred the new office bearers of the Biochemical Society with badges.



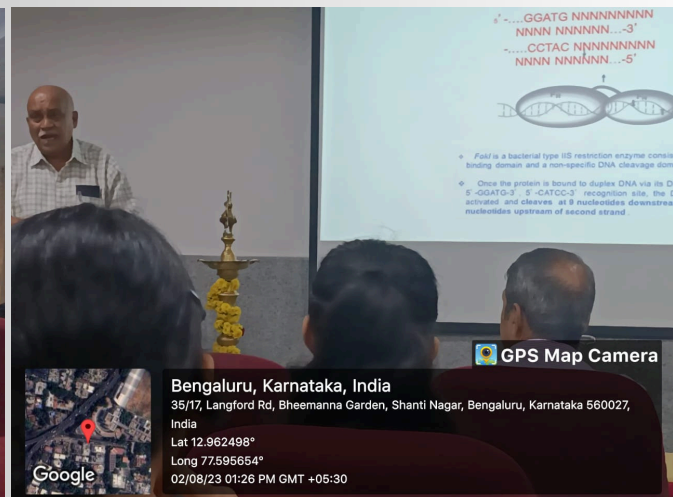
Bengaluru, Karnataka, India  
35/17, Langford Rd, Bheemanna Garden, Shanti Nagar, Bengaluru, Karnataka 560027, India  
Lat 12.962491°  
Long 77.59565°  
02/08/23 01:10 PM GMT +05:30



Bengaluru, Karnataka, India  
35/17, Langford Rd, Bheemanna Garden, Shanti Nagar, Bengaluru, Karnataka 560027, India  
Lat 12.962491°  
Long 77.59565°  
02/08/23 01:09 PM GMT +05:30



Bengaluru, Karnataka, India  
35/17, Langford Rd, Bheemanna Garden, Shanti Nagar, Bengaluru, Karnataka 560027, India  
Lat 12.962498°  
Long 77.595654°  
02/08/23 01:25 PM GMT +05:30



Bengaluru, Karnataka, India  
35/17, Langford Rd, Bheemanna Garden, Shanti Nagar, Bengaluru, Karnataka 560027, India  
Lat 12.962498°  
Long 77.595654°  
02/08/23 01:26 PM GMT +05:30

## AUGUST 12, 2023: FRESHERS' WELCOME (XAVIER HALL, PG BLOCK)

At the start of a new academic year, the newly admitted students wait eagerly for their seniors and faculty members to welcome them. This practice allows for students who have just come from PU College/school to transition to a higher education setting. So, our staff and senior students provided a warm welcome to our new buds to make them "feel at home". The welcome party was organized in Xavier Hall, PG Block. Dr. Sandra Misquith (HoD) addressed the students for about five-minutes and exhorted them to study well and take their career seriously. She also briefed them about the Biochemical Society, which organizes invited lectures and quality events like quiz as well as journal club talks. A few senior students entertained the audience with their fabulous singing. All students were divided into teams and were asked to participate in a biochemistry quiz. The winners of the quiz were awarded with prizes.

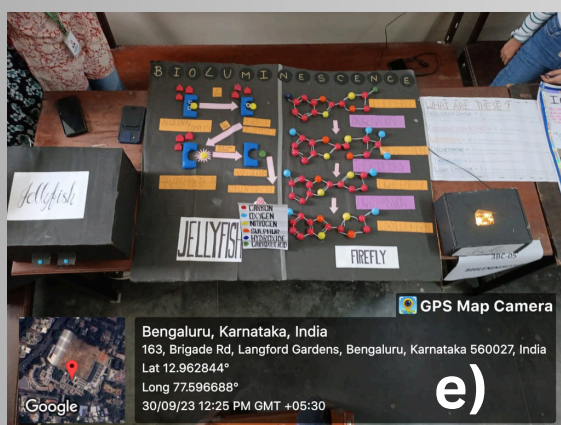
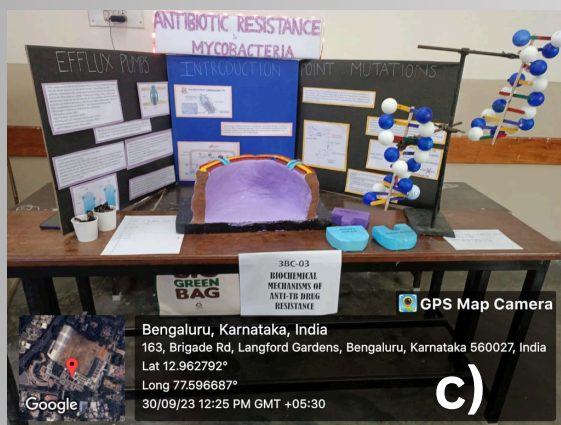
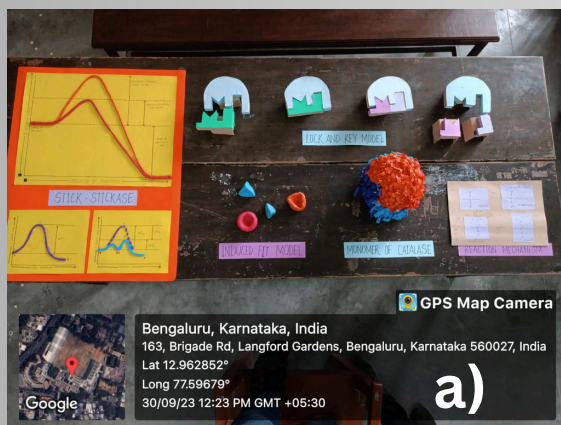


The journal club wing of the Biochemical Society organized a Journal club meeting in S303 and the topics of discussion were – Bee Vaccines (presenters: Alvita Davis and Aishi Mandal – 3rd semester BcBt) and food fads (Snehalakshmi, 5th semester BBZ). Bee vaccines aim to improve bee immunity against bacterial pathogens which cause foulbrood disease, a highly contagious bacterial disease that reduces larvae to brown goo. A killed / dead version of the pathogenic bacteria which is the etiological agent of foulbrood disease is injected into the “royal jelly”, which the worker bees feed to the queen. The queen bee then deposits the vaccine in her ovary and confers immunity against pathogens to her progeny. Sneha Lakshmi shared about super foods and food fads. She addressed the hype about super foods that are routinely encountered in social media. Many super foods are consumed indiscriminately without scientific grounding and harm the body in unexpected ways.



## SEPTEMBER 30, 2023: ELIXIR MODEL PRESENTATIONS (S308)

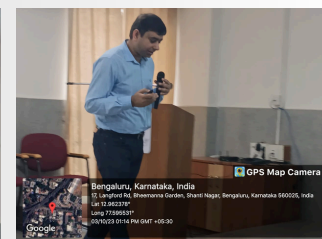
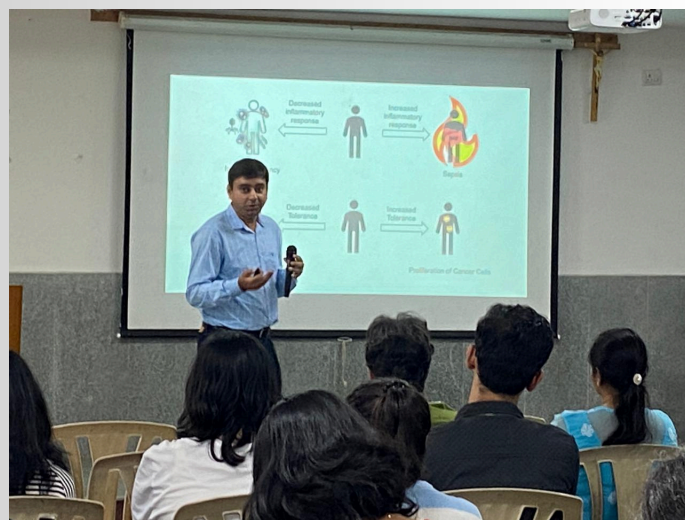
St. Joseph's University organized the programme ELIXIR 2023 on September 30, 2023. 27 Biochemistry students participated by presenting 5 different models / exhibits in room S308. The 5 models were as follows: a) 3BC-01: Mechanism of enzyme action (1st semester BcZ students), b) 3BC-02: Model of ABC transporters (3rd semester BcMb students), c) 3BC-03: Biochemical mechanisms of anti-TB drug resistance (3rd semester BcMb students), d) 3BC-04: Insulin structure and its industrial production (5th semester BBZ students) and e) 3BC-05: Bioluminescence (3rd semester BcBt students). The students presented these models to the judges as well as students and faculty members of other departments. They were able to interact with PU College students who came to visit the exhibits for the SJU Open Day, ELIXIR 2023. This was a great opportunity for students to showcase their ideas and talents. We thank the SJU Management for providing funds for making the models.





# OCTOBER 3, 2023: THE IMMUNOLOGY OF T-CELL DEVELOPMENT (LOYOLA HALL, AUDITORIUM)

The Speaker, Dr Kushagra Bansal from JNCASR Bengaluru, delivered an excellent talk on the role of thymus cells in cell-mediated immunity. T-cells undergo positive selection in the thymus gland. Cells with higher affinity against our own body's self antigens are destroyed, whereas the cells which have lower affinity towards self-antigens are allowed to survive and mature. The mTEC (medullary thymic epithelial cells) possess the Aire (autoimmune regulated) gene which regulates gene expression of a plethora of self-antigens, as detected using DNA microarray and RNAseq. Aire gene interacts with topoisomerase-1, an enzyme involved in DNA topology. Deletion of topoisomerase-1 led to development of mice lacking the thymus gland in his laboratory and this exciting work is being explored in animals. His work has tremendous therapeutic implications in thymus gland development as well as autoimmunity. The talk was received with great enthusiasm by faculty members and students of Biotechnology, Microbiology and Biochemistry.



# NOVEMBER 15, 2023 - FUN ACTIVITY - ANAGRAM (S301)



The Biochemical Society organized a fun event- Anagram in S301. The event was conducted by Deboshree Dutta and Lisa Rex of 1st semester BcZ. They gave the term “carbonic anhydrase” and instructed the participants to construct as many scientific words from the given term (the name of an enzyme). The participants were given close to ten minutes to complete their list of words and were handed out blank paper sheets. The event lasted for just 30 minutes and the persons who coined the most number of words were awarded prizes. The event helped Biochemistry students to learn how to make new words from anagrams and expanded their ability to think and form new words - particularly, scientific words from a given set of letters.



Learning is fun

The Biochemical Society  
Higher than Life

come and join us for the  
**BIOCHEMISTRY ANAGRAMS**

Make as many words as you can from the given word!  
Bonus points for all the chemistry-related words made!

DATE: 15TH NOVEMBER 2023  
TIME: 01:00PM  
VENUE: S301

ENROLL HERE:

Ne  
Rb  
Fe  
Eu  
He  
Ca  
Ar

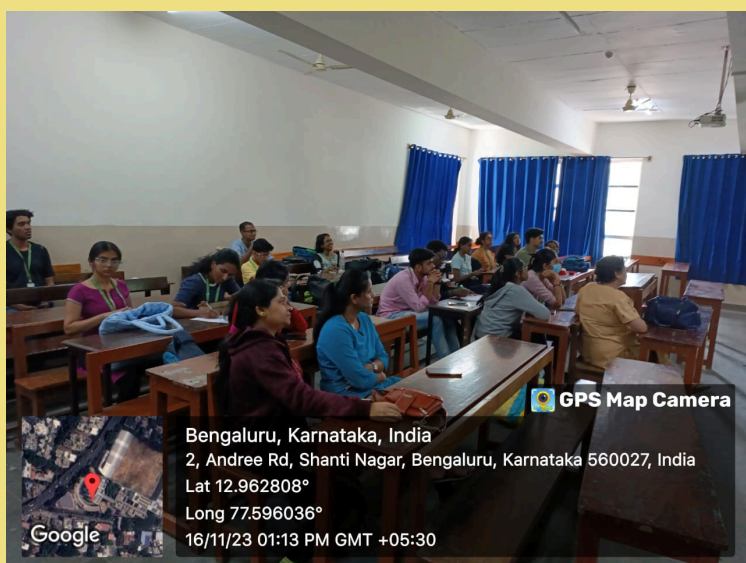
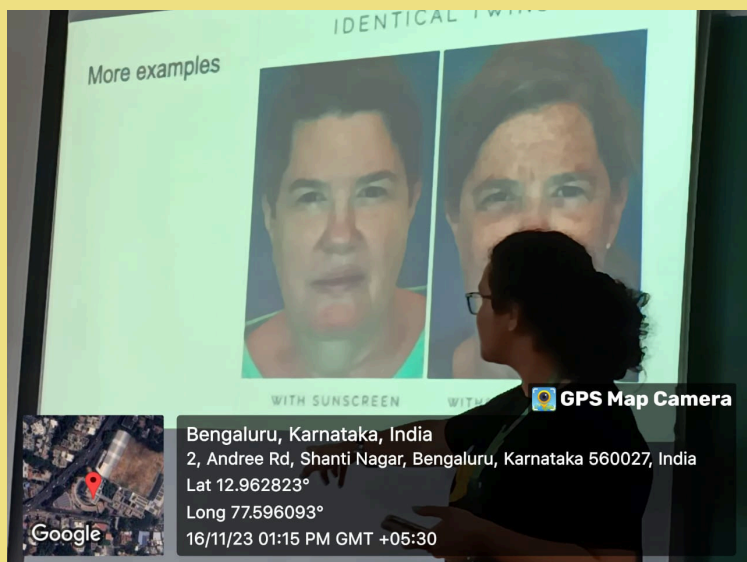
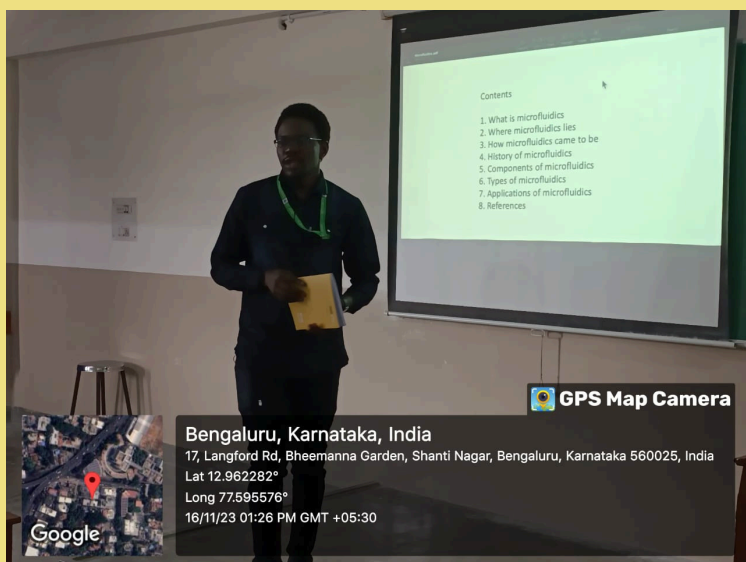
**BIOCHEMICAL SOCIETY PRESENTS**

**JOURNAL CLUB 2023-24**  
**JOIN US FOR FUN AND INTERESTING DISCUSSIONS ON**  
**MICROFLUID AND BREAKING DOWN SUNSCREEN**

**DATE-11TH NOVEMBER**  
**TIME-12:50PM-1:50PM**  
**VENUE-S301**

**THIS IS OPEN TO ALL COMBINATIONS. NO PRIOR KNOWLEDGE REQUIRED. ATTENDEES WILL RECEIVE E-CERTIFICATES**

The journal club wing of the Biochemical Society organized a journal club and the topics of discussion were – breaking down sunscreen (Anandika Banduni from 3rd semester BcBt) and microfluidics (Justin from 5th semester BBZ). Dr. Sandra Misquith (Faculty Coordinator of Biochemical Society and HoD of Biochemistry) and other faculty members joined ~50 Biochemistry students for this programme. Sunscreen is a topical product designed to protect the skin from the harmful effects of ultraviolet (UV) radiation from the sun. Sunscreen works by absorbing, reflecting, or scattering the sun's UV radiation before it can penetrate the skin. Microfluidics is a multidisciplinary field that involves the manipulation and control of tiny amounts of fluids, typically at the microliter to picoliter scale, within microscale channels or devices. A question and answer session was held after each of the talks and the exchange of ideas resulted in enhancing the knowledge of the participants.



# JANUARY 4, 2024: SPECIAL GUEST LECTURE ON AI IN MEDICINE AND BIOLOGY (XAVIER HALL, PG BLOCK)

On January 4, 2024, the Biochemical Society organized a special lecture on AI in medicine and biology in collaboration with Sigma Squared, Department of Advanced Computing. The invited speaker, Mr. Ashwin Colaço, who is currently a PhD student at the University of California (Irvine), delivered a fascinating talk on how AI programs work and how AI is being used for solving mankind's problems in the arena of medicine and biological research. The programme was well-organized and there were more than 250 attendees. Many faculty members from other departments were also present for the talk. After a prayer was recited, a short introduction of the speaker was given. Then the podium was handed over to Mr. Ashwin. He shared his profound insights into the mechanism by which AI programs operate and gave real examples of the usefulness of AI in medicine as well as biology.

**The Biochemical Society**  
(Department of Biochemistry)  
**St. Joseph's University**

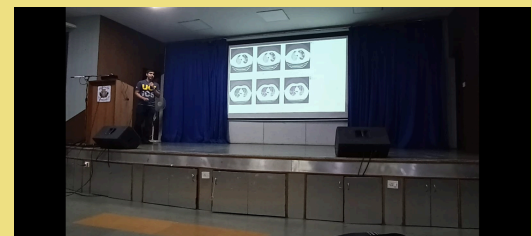
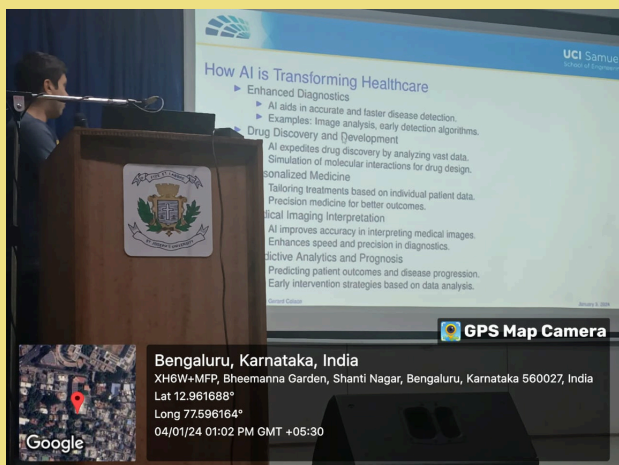
In collaboration with  
**Sigma Squared**  
(Department of Advanced Computing)

presents a talk on:

## AI in Medicine and Biology

by  
**Mr. Ashwin Colaço**  
Doctoral Fellow,  
University of California, Irvine

**When: 04.01.24**  
**Time: 12:50pm**  
**Where: Xavier Hall**



On February 24th, 2024, the Biochemical Society organized 'Biochemia 2.0', an intercollegiate fest that brought together students from various colleges across Bengaluru. The programme was a resounding success, showcasing the academic prowess and creative talents of participants. Four events were organized under the theme of Biochemia 2.0. Teams from Jyoti Nivas College, Mount Carmel College, Kristu Jayanti College, and other institutions enthusiastically competed, displaying remarkable teamwork and ingenuity. The Registrar, Dr. Melwin Colaço inaugurated the fest and Dr. Libi Thomas, the Dean of Chemical Sciences gave away the prizes and certificates to the winners of the events- treasure hunt, creative writing, art and trivia. Biochemia 2.0 exemplified the spirit of collaboration and academic excellence, fostering meaningful connections among students and educators in the field of biochemistry.

**ST. JOSEPH'S UNIVERSITY**  
BENGALURU 560027

THE BIOCHEMICAL SOCIETY PRESENTS  
**BIOCHEMIA 2.0**  
AN INTERCOLLEGIATE FEST

WHEN? 24TH FEBRUARY 2024  
WHERE? XAVIER HALL, ST. JOSEPH'S UNIVERSITY  
WHAT TIME? 9:00AM. TO 3:00 PM.

EVENTS:

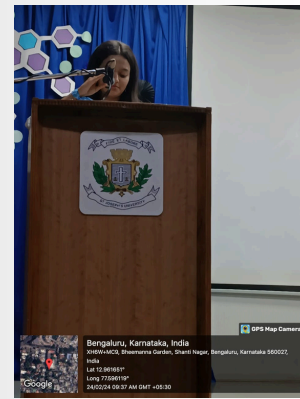
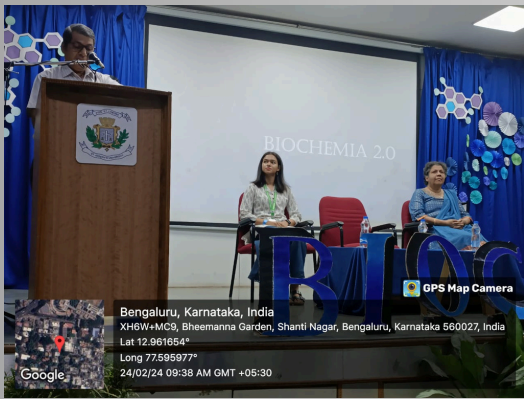
- ART
- MURDER MYSTERY TREASURE HUNT
- TRIVIA
- CREATIVE WRITING

WHOM TO CONTACT?

1. APOORVA WALTERS: 9902011499
2. AISHI MANDAL: 9836522186
3. ALVITA DAVIS: 7022416880
4. ANANDIKA BANDUNNI: 9148340333
5. SODRAJ NAIR: 8431859122

SCAN FOR DETAILS!

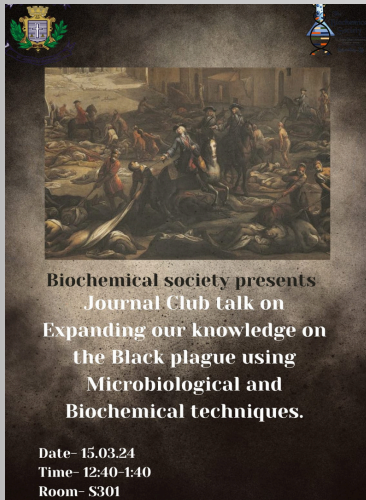
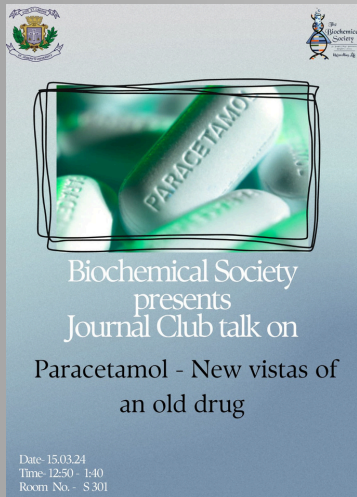
<https://drive.google.com/file/d/13268a8f8b88mVJyWjYkChfK7aV6abJusndfzssdsk/view>



# Journal Club

**MARCH 15,  
2024:  
JOURNAL CLUB  
MEETING (S301)**

The journal club wing of the Biochemical Society organized a meeting on March 15. The first talk, "Paracetamol - new vistas for an old drug" was presented by Varsha SJ from 3rd year BBZ and T. Tom Alben (21CBZ44). Paracetamol is highly toxic and is consumed nowadays almost as if it were candy, as it is available over-the-counter. The toxicity of paracetamol and its mechanisms of liver damage were brought out well. Paracetamol is sold over-the-counter and many people self-medicate without the doctor's consultation. Hence, this talk was an eye-opener as it helped create awareness on paracetamol and its toxic effects. Suhotra Das from 2nd semester BcBt spoke on how many spiritual and religious myths were believed about pandemics and shared his reflections from historical records. He also unravelled the importance of microbiological and biochemical techniques in deciphering crucial information pertaining to past pandemics. Faculty members and nearly 30 students from various departments participated in the programme.



# A new cycle begins

**MARCH 28, 2024:  
BIOCHEMICAL SOCIETY  
ELECTION - 2024**

The Biochemical Society election for office bearers was held on March 28, 2024 at S303. All students who took Biochemistry major (all combinations) participated in the voting process. The election was facilitated by the outgoing office bearers of the Biochemical Society and new candidates were chosen to replace them. Ballot papers were circulated and all the participants voted for their candidates of choice for each of the posts in the Biochemical Society. The Department of Biochemistry and Biochemical Society thanks the outgoing office bearers for their service and efforts to organize programmes meticulously and make science and learning a wonderful experience. We hope that the new office bearers will take the Biochemical Society to much greater heights.



 **GPS Map Camera**

Bengaluru, Karnataka, India

2, Andree Rd, Shanti Nagar, Bengaluru, Karnataka 560027, India

Lat 12.962899°

Long 77.595892°

28/03/24 01:24 PM GMT +05:30

 Google



# Solutions

## TO PUZZLES, CROSSWORDS AND QUIZ



### I. Solution to the Crossword puzzle from page 19

#### Down

1. Pasteur
2. Enzymes
3. Carcinogen
4. Glycogen
7. Central Dogma

#### Across

3. Cohesion
5. Porphyrin
6. Protease
8. Corticotropin
9. Histidine

### II. ALL WE NEED IS CHEMISTRY : A WORD HUNT - PAGE 25

#### WORDS THAT CAN BE FORMED:

**METABOLISM ; ACIDITY ; CARBON ; RACEMIC ; BORON ; ENANTIOMERS ; ALCOHOL ; VISCOSITY ; HAEMOGLOBIN ; KINETICS ; HALIDES ; ORBITALS ; COVALENT ; BASE**

### III. SOLUTION TO CROSSWORD PUZZLE - PAGE 17

#### ACROSS

- 4) MITOCHONDRIA
- 5) ENANTIOMERS
- 9) SCALE
- 10) ENZYME
- 12) CONIDIA
- 13) PSI
- 14) CONDUCTION
- 15) GLYCOLYSIS

#### DOWN

- 1) NUCLEONS
- 2) LIPIDS
- 3) RIBOSE
- 6) TRANSCRIPTION
- 7) SUBSTRATES
- 8) CAMEL
- 11) MITOSIS

### IV. MURDER MYSTERY SOLUTIONS:

#### PUZZLE (PAGE 18 & 19)

1. HEMOPHILIA
2. INHERITANCE
3. CARRIER
4. FACTOR IX
5. X- CHROMOSOME
6. GLYCOLIC ACID
7. ETHYLENE GLYCOL

#### Conclusion (Murder mystery puzzle from page 18 & 19):

In the end, Emily Blackwood emerges as the perpetrator of Alexander's murder, her actions driven by hidden motives and a desperate bid for inheritance. She adds small amount of Antifreeze in the Factor IX bottle. Ultimately, Alexander died due to multiple organ failure and vomiting.



# Riddle – me – ree – who am I?

(from page 26)

1. Symbolically not in silver but definitely in gold.

My discovery helped elucidate biochemical processes so I am told. Who am I?

**Uranium**

2. I am in the air, I am everywhere.

Sadly too much of me is bad, so beware! Who am I?

**Oxygen**

3. I glitter, I shine but I am not gold.

Stop fooling around and do as you are told! Who am I?

**Fools gold (Iron pyrite – FeS<sub>2</sub>)**

4. You'll find me in plenty in milk and in bones.

the origin of my name I share with Gods of old. Who am I?

**Protein – Proteus**

5. Though I am sweet, when there's wind in my sails – energy is high.

I flip I flop I crash on my couch, energy is lowered – I sigh! Who am I?

**Glucose**

6. Half my name is "good" in French

Just rally around and avoid falling in the trench! Who am I?

**Carbon**

7. Temperatures rise quickly so I can tell

A glass of me will kill not quell! Who am I?

**Mercury**

8. Beautiful structures - Oh maybe I am not,

But I sure can insulate you from quite a lot! Who am I?

**Triglycerides – Fats- lipids**

9. Like a caged bird I float on the sea. Cholesterol excites me but glucose is sweet.

A lot of life's processes depend on me! Who am I?

**Water**

10. I haven't got a side chain; I'm unique but very plain.

With my buddy glutamate, I'm active in the brain. Who am I?

**Glycine**

Dr. Sandra Misquith

# The President's address



Science isn't confined to the pages of textbooks; it permeates every facet of our existence. From the food on our plates to the rhythms of our sleep, Biochemistry serves as the illuminating lens through which we understand the world. Personally, I've always found joy in applying my knowledge of this subject to my daily life, unravelling the intricacies of my own biology. It was this passion that drove me to envision The Biochemical Society as more than just a platform for academic discourse but as a vibrant hub for exploring the breadth and depth of Biochemistry. Throughout the year, our society has endeavoured to transcend the boundaries of the syllabus, infusing our activities with creativity and practical application. From our engaging "fun events," which seamlessly blended games with scientific insights, to our intellectually stimulating Journal club sessions and seminars, we strived to make Biochemistry come alive for our members.

Undoubtedly, our crowning achievement this year was the resounding success of BIOCHEMIA 2.0, our intercollegiate fest. Drawing participants from colleges across Bangalore, the event showcased not only the depth of our subject matter expertise but also the remarkable organizational prowess of our team. I extend my heartfelt gratitude to every member who contributed to its success, especially our enthusiastic first-year leaders whose dedication and innovation were truly inspiring. Serving as President has been an enriching journey, one marked by continuous learning and growth. I am deeply grateful to my fellow office bearers for their unwavering support and collaboration. Likewise, I extend sincere appreciation to our professors whose guidance has been instrumental in shaping our endeavours. As we reflect on the accomplishments of the past year, let us also look forward with optimism and determination. While there is always room for improvement, I take pride in the strong foundation we have laid. With each passing day, may our association evolve and thrive, nurturing a love for Biochemistry that transcends boundaries. In closing, I extend my best wishes to The Biochemical Society for its future endeavours. May it continue to be a beacon of knowledge and inspiration, fostering curiosity and innovation in the realm of Biochemistry.

With physiologically optimal warm wishes and regards,

**Apoorva Rachel Walters**

President, The Biochemical Society (2023-2024)



# SIGNING OUT

**Dr. Sandra Misquith,  
HoD, Department of Biochemistry**



It's that time of the year once again. Nostalgia hits us again. Moments of fun and laughter flash by. Moments of sadness too grip us but friends and family have stood by us. There have surely been difficult moments, when things seemed so unfair. Efforts gone wasted and plans gone awry. Once more, we are grateful for a year gone by. To live is to learn and to learn is to live, a year in college surely tells us so. Everyday has been precious as it has brought not only new people into our lives, but also has taught us to live together in harmony, in peace and in love with the old ones too.

I look back to 2020, a momentous year for the world when an unseen being, not even sure if it is truly living, hit the world with a vengeance; then the department of biochemistry at St. Joseph's was born. For Dr. Mohandas and me it was a number of firsts after a successful career of offline teaching. We were faced with new vocabulary, new ways to deal with students, new technologies to learn – none of it easy. The most challenging being the online classes faced with unknown faces, trying to involve all and sometimes failing miserably when one saw students who hadn't signed out even after the class was well over and done with, finally I'd give up, why waste band width (new term) just to find out when they would wake up and realize the class was over (old ways). I felt I was devising new ways to ensure they were online at least for the duration of my class. Avoiding too many extra classes but failing as I always do, because my two penny bits are so much more valuable than teaching chemistry or that's what I thought! I doubt if my students think the same way too.

We now bid farewell to our second batch of students. We don't say farewell but fare forward friends as in the words of TS Elliot. I can't sign off without quoting my all time favourite: "Sweet are the uses of adversity that like a toad, ugly and venomous wears yet a precious jewel in its head" – William Shakespeare. Wishing all of you all the very best as I sign out for the academic year 2023-2024 till we meet again in the coming academic year.

# ACKNOWLEDGEMENTS

The department of Biochemistry thanks the outgoing team of office bearers (2023-2024) for their hard work and active participation. They did a tremendous job in planning and organizing events for the Biochemical Society. The list of the outgoing office bearers is given below:

**President** - Apoorva Walters  
**Vice president** - Alvita Davis  
**Treasurer** - Aishi Mandal  
**General Secretary** - Sneha Bhattacharjee  
**Logistics Head** - Anandika Banduni  
**Media Head** - Shreshta Nandy  
**PR Head** - Tanisha Nandi  
**Asst. PR Head** - Titas Das  
**Creative Head** - Bidishaa Chakraborty  
**Journal Club President** - Palak Dubey  
**Journal Club Secretary** - Sanya R

We sincerely thank **Rakshit (20BBZ)** for designing the Biochemical Society logo.

The Editors thank **Aditi Vishwanath (21BBZ)** for her voluntary help with editing the newsletter and for providing valuable suggestions. The Editors are also obliged to thank all the contributors who made their valuable contributions, which have certainly made this first edition of the Biochemia newsletter 2024 a grand success.

On behalf of the Editorial team,

**Dr. Daniel Andrew M. Gideon,**  
Department of Biochemistry



## ABOUT THE DEPARTMENT

The Department of Biochemistry was founded in the year 2020. It is a youthful and dynamic Department that strives to provide an exceptional course where students can learn and ultimately serve society. The Department boasts of highly qualified faculty that serve as mentors, aiming to create a student-focused programme that prioritises the students' learning experience. Students are encouraged to learn, apply, and design their projects. The programme also emphasises leadership skills and offers fun and engaging programmes that teach Biochemistry in enjoyable ways.

### Strengths of the course:

- a robust curriculum that aligns with the latest trends in Biochemistry education and research
- special attention to weaker students
- promotes self-learning, and enhances analytical thinking skills
- trains students to think, innovate and be independent



**OUR UNDERGRADUATE BIOCHEMISTRY PROGRAMME IS ONE OF INDIA'S FINEST. WE OFFER THE IDEAL FOUNDATION FOR YOUR PROMISING FUTURE.**

**DISCOVER YOUR PERFECT PROGRAMME COMBINATION FROM OUR RANGE OF OPTIONS AVAILABLE FOR YOU:**

- BIOCHEMISTRY-BIOTECHNOLOGY**
- BIOCHEMISTRY-BIOLOGY**
- BIOCHEMISTRY-MICROBIOLOGY**
- BIOCHEMISTRY-ZOOLOGY**



FOR MORE DETAILS



**ST JOSEPH'S UNIVERSITY**  
LALBAGH ROAD, BENGALURU

# 2024

ADMISSIONS OPEN

DEPARTMENT OF BIOCHEMISTRY

SCHOOL OF CHEMICAL SCIENCES

# SINCE 2020



### TESTIMONIALS FROM ALUMNI



"Studying biochemistry has broadened my knowledge base significantly, making me adaptable and open to exploring various fields. I've gained valuable skills that allow me to confidently pursue opportunities across different sectors, from food technology to biotechnology and beyond."

- Ishika, BSc BBZ, 2020-2023



"The undergraduate Biochemistry course provided an exceptional learning experience, with engaging projects and knowledgeable, approachable instructors. It served as a crucial stepping stone in shaping my career, equipping me with valuable skills and knowledge. Thank you for the excellent contribution to my professional journey".

- Divya, BSc BBZ, 2020-2023



"The biochemistry course provided me with a very good foundation in chemistry which is of vital importance in any life science studies. I also got exposure on how project work is done and gained hands on experience in various laboratory techniques."

- Nritika, BSc BBZ, 2020-2023



"Right from the first biochemistry class, this course has possessed an excellent tailor-made syllabus. This course has the right vital focus on the fundamentals and basics of physical and organic chemistry, followed by the focus on concepts of biochemistry in the right sequence. Both theory and practical classes were excellently handled. Qualities and skills of working in a team for a research project, combining ideas and interests, the importance of clear communication and paper presentations were thoroughly inculcated in me through this valuable course at SJU".

- Himesh, BSc BBZ, 2020-2023

### CAREER PROSPECTS IN BIOCHEMISTRY

- ACADEMICS (RESEARCH AND TEACHING)
- AGRICULTURAL SCIENCE
- FOOD AND COSMETIC INDUSTRIES
- BIOTECHNOLOGY INDUSTRIES
- PATENT LAW
- PHARMACEUTICAL INDUSTRIES
- PUBLISHING AND SCIENTIFIC WRITING
- FORENSIC SCIENTIST
- ANALYTICAL AND DIAGNOSTIC TECHNICIAN



To Apply, Go To  
[www.sju.edu.in](http://www.sju.edu.in)

