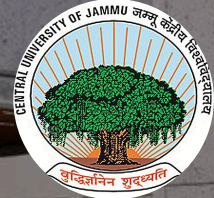




Department of Biotechnology and Bioengineering
(Centre for Molecular Biology)

Biotech Gazette 2026

POWERED BY CURIOSITY,
DRIVEN BY DISCOVERY



January 2026 Edition BIOTECH GAZETTE

Department of Biotechnology and Bioengineering

Guided by the motto 'बुद्धिर्ज्ञानेन शुध्यति' (**Knowledge refines, purifies, and sharpens the mind**), Central University of Jammu celebrates a decade of academic excellence. Embracing NEP 2020, we prioritize high-quality teaching, impactful research, and community engagement to bridge the student-institution gap. Central University of Jammu empowers students with knowledge and skills to become critical thinkers, ethical leaders, and responsible citizens, contributing to a brighter future for India.



**Prof. (Dr.) Sanjeev Jain
Hon'ble Vice Chancellor**

We are immensely proud to have Prof. Sanjeev Jain at the helm of our institution. Under his visionary leadership, we have witnessed remarkable growth and progress in both academic and research excellence. His unwavering dedication to fostering a culture of innovation and inclusivity has significantly enriched our community. The Hon'ble Vice-Chancellor's commitment to nurturing young minds and promoting collaborative endeavors has set a high standard for all of us to aspire.

We are delighted to recognize the exceptional leadership of our esteemed Head of Department, Dr Narendra K Bairwa. His dedication to academic excellence and unwavering commitment to advancing our field have been truly inspiring. Through his innovative approaches and collaborative spirit, he has fostered a vibrant learning environment that encourages growth and discovery.



**Dr Narendra K Bairwa
Director CMB**

MENTORS



**Prof. Mushtaq Ahmed
(Professor)**



**Dr. Narendra K Bairwa
(Associate Professor & H.O.D)**



**Dr. Shelly Sehgal
(Associate Professor)**



**Dr. Amit Sahu
(Assistant Professor)**



**Dr. Sudhir Singh
(Assistant Professor)**



**Dr. Fareeda Akhtar
(Assistant Professor)**

We are deeply grateful for the invaluable guidance and unwavering support provided by our esteemed faculty mentors. Their commitment to sharing knowledge, offering encouragement, and inspiring the next generation has left an indelible mark on our community.

- **Fathimi N**

An M.Sc. Biotechnology student at CU Jammu who blends a deep curiosity for science with a creative flair for baking and craft business.



- **Prachi Sharma**

An M.Sc. Biotech student dedicated to exploring research that benefits society and enhancing scientific communication through the magazine club.



- **Isha Sharma**

A diligent Editorial Board member and content writer committed to ensuring every publication is clear, coherent, and meticulously proofread.



- **Sachi Chauhan**

A passionate biotechnology enthusiast focused on unraveling new scientific concepts and sharpening communication skills within the department.



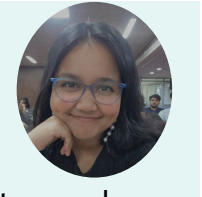
- **Karanjot Singh**

A life sciences student interested in molecular biology and tumor research, who finds creative inspiration in nature, poetry, and dance.



- **Sanjukta Ray**

A curious mind in the field of molecular biology, eager to explore new perspectives and contribute effectively to the club's growth.



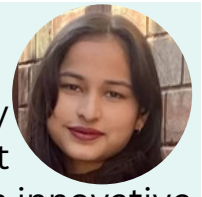
- **Maira Sajawal Sharma**

A biotechnology student focused on cancer biology and bioinformatics, using writing to inform and leave a lasting impression.



- **Shaweta Sharma**

A passionate Biotechnology student with a keen interest in bridging the gap between innovative research and practical application, aspiring to share the wonders of science.



We are incredibly proud of the outstanding work done by our dedicated editorial team, Genetic Guild. Their passion for excellence and commitment to delivering high-quality content have been instrumental in shaping our newsletter. Through their meticulous attention to detail and unwavering dedication, they have ensured that every issue is both informative and engaging for our readers.

FACULTY SPOTLIGHT

Welcoming Our New Faculty Member



We are pleased to welcome

Dr Amit Kumar Sahu

to the Centre for Molecular Biology.

With a strong foundation in molecular biology and immunology, Dr Sahu brings valuable research experience and a thoughtful approach to teaching that will enrich our academic environment.

Research Focus

- tRNA biology
- Gene expression
- Translation initiation
- Host pathogen interactions

His research examines how subtle molecular variations, particularly in RNA, can influence broader cellular processes.

Scholarly Contributions

Published in leading journals such as:

- *Journal of Bacteriology*
- *Journal of Molecular Biology*
- *Cell Death & Disease*

and other peer-reviewed publications advancing RNA biology and molecular research.

Academic Background

Ph.D. : Indian Institute of Science (IISc), Bangalore

- Investigated the physiological significance of tRNA sequences and modifications in bacterial growth and protein synthesis

Research Experience: National Institute of Immunology, New Delhi

- Studied host-pathogen interactions with a focus on liver-stage malaria using molecular and cellular approaches.

Teaching and Mentorship

Dedicated to a research-oriented learning environment, emphasising:

- Conceptual clarity
- Critical thinking
- Active student engagement

Beyond the Laboratory



Cricket



Cooking



Riding



Looking Ahead

Dr. Sahu aims to contribute to strengthening the research ecosystem at the Centre for Molecular Biology through interdisciplinary collaboration, mentorship of young scientists, and the development of innovative research programs addressing both fundamental and applied biological questions.

From the HOD's Desk

Genes, Environment & Human Health

I am happy to introduce this informative article series on genes & environment interaction and human health. In this section of the newsletter, we present the role of genes and environmental interaction based on evidence from published research in the public domain.

Every month, we will be presenting information on common environmental factors affecting present and long-term human health. This evidence-based commentary aims to create awareness among all our readers. In the series, we begin by shedding light on Fetal Alcohol Spectrum Disorders.

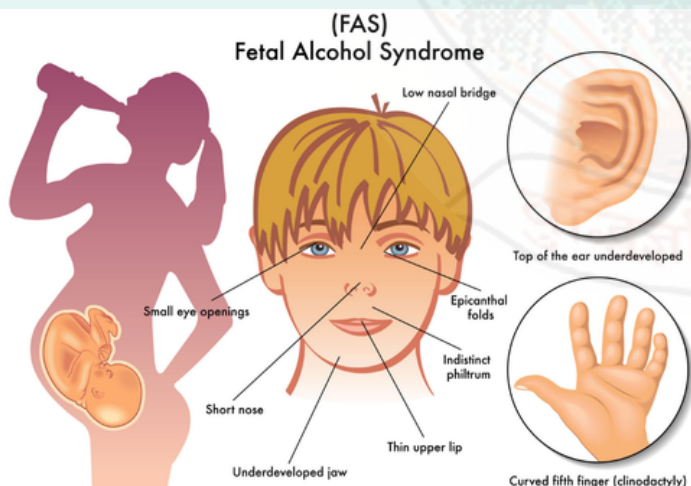
- Dr. Narendra K Bairwa, Head of Department



Dr. Narendra K Bairwa
Head of Department

Fetal Alcohol Spectrum Disorders

Alcohol has long held societal acceptance across population groups – but biological research tells a very different story about its impact on human health and future generations.



The scientific evidence of the impact of alcohol consumption was published by Stockard in 1910 in the American Journal of Anatomy, where he stated that prenatal alcohol exposure may damage the developing embryo. It took some time to accept that this is true.

100% Preventable

Prenatal alcohol exposure is a leading, preventable cause of birth defects and developmental disabilities. Up to 1 in 20 school-age children may be affected, yet every single case is avoidable. Prevention starts before pregnancy.

Alcohol consumption by pregnant women and exposure to the foetus can lead to developmental disorders and intellectual disability. FASD is not a single diagnosis, it is an umbrella term covering a spectrum of lifelong conditions.

Myth vs Fact: CRISPR-Cas9 Gene Editing

MYTH

- Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) and CRISPR-associated protein 9 (Cas9) always edits DNA perfectly.
- CRISPR-Cas9 edits are always permanent and flawless.



FACT

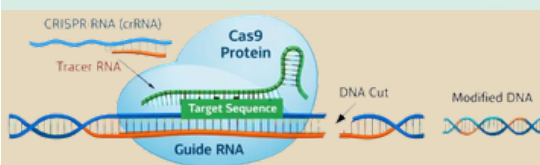
- CRISPR-Cas9 is a highly accurate gene-editing tool, but it's not always 100% precise.
- Sometimes it may cut similar DNA sequences, leading to off-target effects.

What is CRISPR-Cas9?

CRISPR-Cas9 is a gene-editing tool that acts like molecular scissors to cut DNA at specific sites using **guide RNA** (gRNA) and the **Cas9 protein**. Discovered in bacteria, it is widely used for precise genetic modifications. Its importance was recognized with the **2020 Nobel Prize** in Chemistry awarded to **Emmanuelle Charpentier and Jennifer A. Doudna**.

Why People Think It's Perfect

Diagrams often show precise DNA cutting, which can give the impression that CRISPR is always accurate.



The Real Scientific Truth

CRISPR-Cas9 is very accurate, but not perfect.

Possible limitations include:

- Off-target effects: Cutting similar DNA sequences.
- DNA repair changes: Small insertions or deletions after cutting.

Why CRISPR Is Still Revolutionary?

Despite small limitations, CRISPR-Cas9 is far more precise than older gene-editing methods.

Scientists use it to:

- Study gene functions
- Treat genetic diseases
- Improve crop traits
- Advance cancer and medical research

WHY YOU'RE 99.9% THE SAME AS EVERYONE ELSE?

Ever Wondered?

- Why do you look like your parents?
- Why are you not exactly like your siblings?
- Why aren't identical twins completely identical?

The answer lies in DNA.

How do scientists study DNA?

- PCR: Makes copies of DNA
- DNA sequencing: Reads the genetic code
- CRISPR: Edits genes

Why This Matters Today?

- Predict disease risks
- Personalised treatments
- Early detection
- Precision medicine

You Are 99.9% the Same!

Only 0.1% of your DNA makes you unique.

WHAT IS DNA?

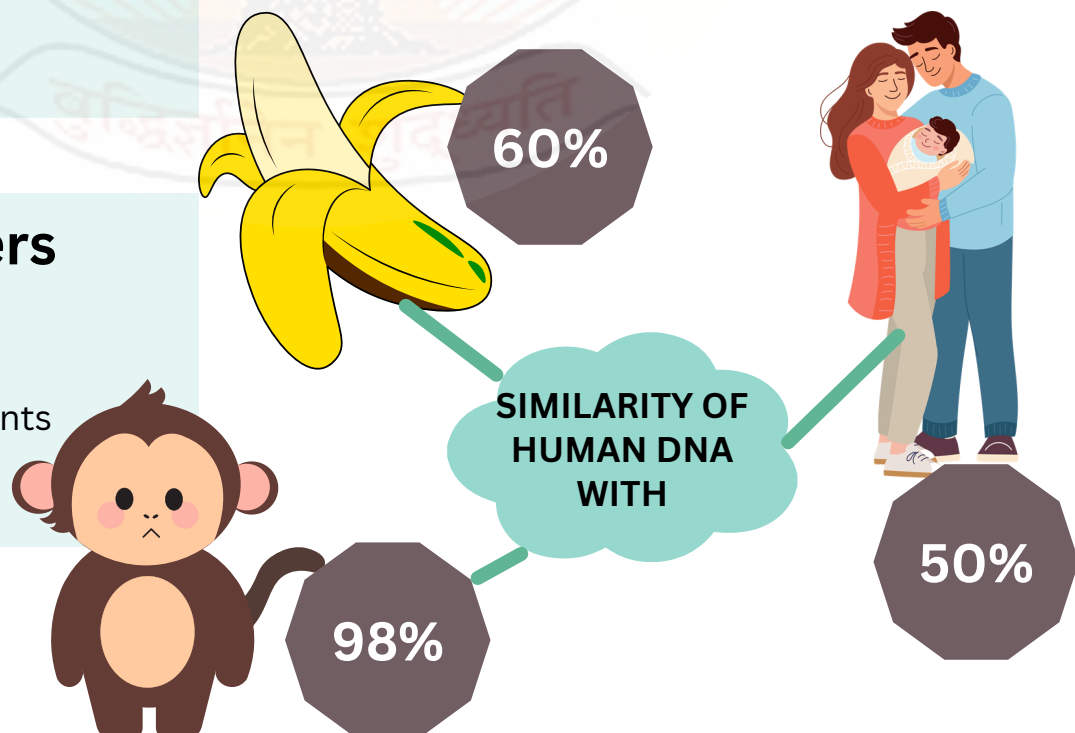
DNA is like a biological instruction manual inside your cells.

It tells your body:

- What colour should your eyes be.
- How tall you might grow.
- How your immune system works.
- How do you respond to diseases.

DNA = Recipe Book

Genes = Individual Recipes



AI Tool Reveals Hidden Life of Cells

Inside diseased tissue, a new tool reveals hidden cellular behavior



Researchers at **Yale University** have developed a powerful AI system that allows scientists to see not just what cells look like, but what they are actually doing inside diseased tissue.

Published in **Nature Biomedical Engineering**, the tool, called spEMO, combines multiple layers of biological data into one unified system.

Unlike traditional microscopes, which focus only on cell structure, **spEMO reveals cell shape, gene activity**, and protein expression at the same time.

This integrated approach helps scientists uncover interactions and patterns that were previously impossible to detect.

Beyond the Microscope

While traditional microscopes show scientists what cells look like, spEMO reveals what they do at the genetic and protein level.

This breakthrough AI technology could transform disease research by

- Showing how cells behave in real time
- Connecting cellular changes to specific diseases
- Helping identify new targets for treatment



Did you know?

AI tools like spEMO reveal what cells do, not just, how they look.

Biotech Breakthroughs: January 2026

From aging research to next-gen antibiotics

Fast-Aging Fish Reveals Kidney Secrets

30 Jan 2026

- **Model:** African turquoise killifish ages in 4–6 months, useful for ageing studies.
- **Ageing effect:** Kidney damage, inflammation, and loss of blood vessels.



Monk Fruit Reveals Hidden Health Benefits

14 Jan 2026

- Used as a natural sweetener
- Contains antioxidants
- May support metabolism and immunity



New Test Reveals Antibiotic That Truly Kills Bacteria

12 Jan 2026

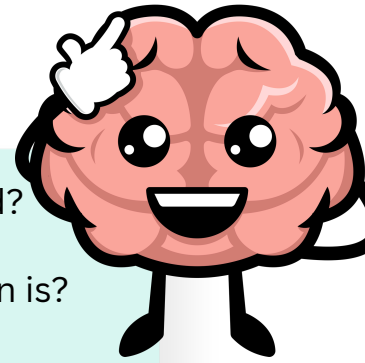
- Developed by the University of Basel.
- Identifies drugs that fully kill bacteria and detects hidden survivors.
- Supports better control of infections
- Helps reduce antibiotic resistance.

New Sweetener, Antibiotics, and More ...

Your quick roundup of the latest findings in the world of biotech.

BIO RIDDLES

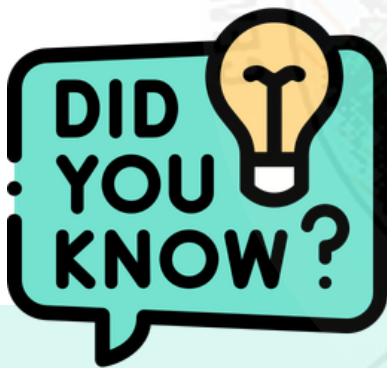
Can You Crack These ?



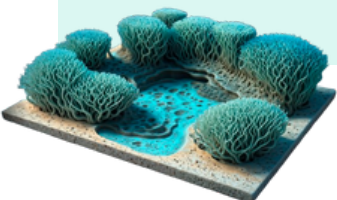
1. Gene flow between species through hybridization is termed?
2. The formation of a new species without geographic isolation is?
3. Programmed organismal aging with minimal functional decline is termed?
4. The stable coexistence of multiple species occupying similar niches is explained by?
5. The splitting of one lineage into two distinct species is?

ANSWERS

1. Introgession
2. Sympatry
3. Senescence
4. Niche Partitioning
5. Cladogenesis



- The *Axolotl* can regenerate entire limbs, spinal cord, and even parts of its brain.
- The jellyfish *Turritopsis dohrnii* can reverse its life cycle, earning it the nickname "immortal jellyfish."
- Some bacteria living in deep-sea vents survive at temperatures above 100 °C.



REFERENCES

MYTH VS FACT: CRISPR Cas 9 gene editing

- Peer-reviewed review article on CRISPR–Cas9 from BMJ (via NCBI/PMC) and Nobel Prize in Chemistry 2020 scientific reports.

SCIENCE SIMPLIFIED: WHY YOU'RE 99.9% THE SAME AS EVERYONE ELSE?

- <https://www.nature.com/scitable>
- <https://www.yourgenome.org>

BIOTECH BREAKTHROUGHS JANUARY 2026:

- <https://www.sciencedaily.com/>

BIO RIDDLES

- <https://www.ahapuzzles.com/brain-teasers/riddles/biology/>

ONE MINUTE READ: AI TOOL REVEALS HIDDEN LIFE OF CELLS

- <https://ysph.yale.edu/news-article/new-ai-tool-helps-scientists-see-how-cells-work-together-inside-diseased-tissue/>

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BIO RIDDLES

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ONE MINUTE READ

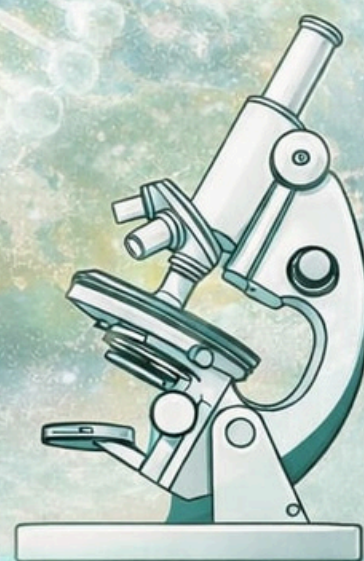
SHAWETA SHARMA

“Science is not just a subject,
but a way of thinking.”

— Carl Sagan

We value your feedback!

Scan the QR code to help
us improve future editions.



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