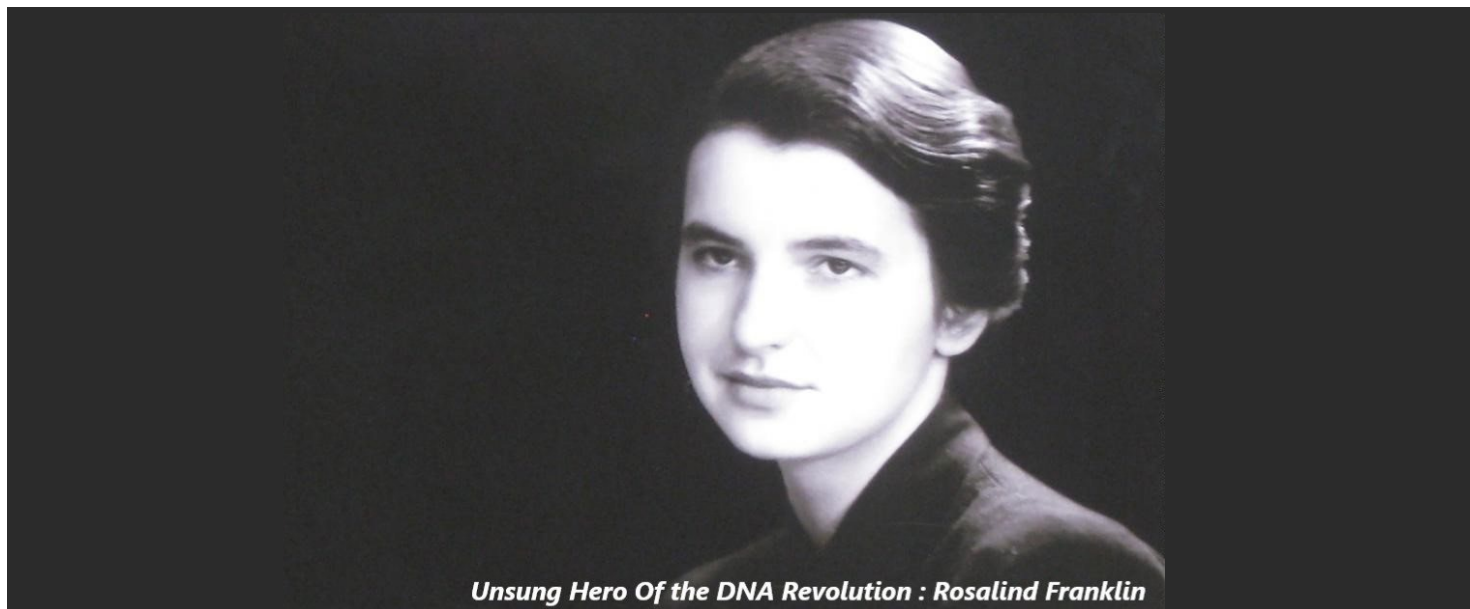


Synapse

OFFICIAL E-NEWSLETTER OF DEPT. OF BIOTECHNOLOGY
RAMA DEVI WOMEN'S UNIVERSITY



Unsung Hero Of the DNA Revolution : Rosalind Franklin

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EDITOR'S Desk



We started the year with our flagship seminar series in remembrance of Dr. Rosalind Franklin-the unsung hero of the DNA revolution. This is an attempt to all the budding women students of the University that the sky is the limit for them. While the year gave us the first malaria vaccine, new COVID-19 variants were also discovered across the world suggesting that the war has not ended. I also congratulate all the students for their achievements and wish them a bright future ahead.

Department Activities

ROSALIND FRANKLIN SEMINAR SERIES

In 1952, while working as a research associate at King's college in Cambridge, England, Rosalind Franklin produced the first usable X-ray pictures of DNA ever taken. Franklin's crucial contribution to science went largely unrecognized. In honor of Rosalind Franklin, the scientist whose research played a critical role in the discovery of the structure of DNA, a seminar series involving various lectures by eminent guest speakers was conducted by the Dept. of Biotechnology at Rama Devi Women's University.



Dr. Archana Chugh

Kusuma School of Biological Sciences, Indian Institute of Technology, Delhi

Dr. Archana Chugh spoke about “**Peptide mediated therapeutics**”. Dr. Chugh talked about the role of peptides in drug delivery, the difference between Cell penetrating peptides (CPPs) and Antimicrobial peptides (AMPs) and the various sources which are being explored for CPPs including marine organisms, snakes, wasps venom or toxin. She provided insights into the drug delivery ability of CPPs, emphasizing on Fungal Keratitis. She discussed her research findings about how CPPs can be used to deliver natamycin to the cells, which will help to solve the problem of natamycin’s low permeability and eventually reduce dosage frequency.

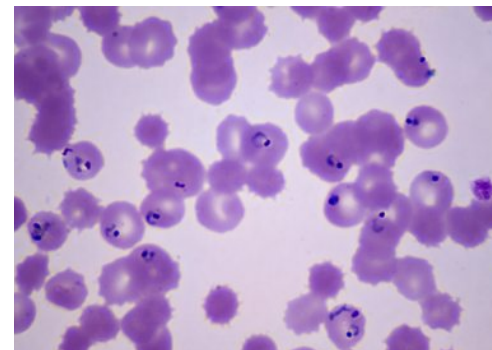
Dr. Chugh also talked about the use of CPPs for anticancer drug delivery. For this purpose, antimir210 molecule has been studied which is expressed in Glyma, a rare form of Brain Cancer. CPPs against the Glyblastoma (GBM) cell lines were screened & found out that Tachyplesin(Tpl), derived from horseshoe crab has the ability to cross the blood brain barrier.



Dr. Debadutta Mishra

Deputy Director, National Food Laboratory, Kolkata

Dr. Debadutta Mishra spoke about “**Food Safety And Quality Control.**” Dr. Mishra talked about the importance of food safety, emphasized on the FSSAI Rules and Regulations, National Accreditation Board for Testing and Calibration Laboratories (NABL) and criteria required for accreditation to food laboratories. Therefore, a form of protection is needed to keep the food safe and hygienic. The webinar provided insights about various steps involved in food safety and the flow of lab information involved in quality control. At the end, there was a brief discussion on potential food safety problems related to new uses of Biotechnology and various career aspects in the field of Food Biotechnology.



***P. falciparum* in ring stage in human red blood cells. Source : UTSouthwestern Medical Center**

OMICRON SARS-COV-2 VARIANT: A NEW CHAPTER IN THE COVID-19 PANDEMIC

On Nov 25, 2021, about 23 months since the first reported case of COVID-19 and after a global estimated 260 million cases and 5.2 million deaths, a new SARS-CoV-2 variant of concern (VoC), omicron, was reported. The principal concerns about omicron include whether it is more infectious or severe than other VoCs and whether it can circumvent vaccine protection.

Omicron has some deletions and more than 30 mutations, several of which (eg, 69–70del, T95I, G142D/143–145del, K417N, T478K, N501Y, N655Y, N679K, and P681H) overlap with those in the alpha, beta, gamma, or delta VoCs.

These deletions and mutations are known to lead to increased transmissibility, higher viral binding affinity, and higher antibody escape. Some of the other omicron mutations with known effects confer increased transmissibility and affect binding affinity.

The impact of omicron on transmissibility is a concern. If the overlapping omicron mutations maintain their known effects, then higher transmissibility is expected, particularly because of the mutations near the furin cleavage site. The omicron variant is spreading pretty fast, which may be a sign of why the variant is so alarming for the rest of the world.

For more details, go to : [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(21\)02758-6/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)02758-6/fulltext)

For more details, go to : <https://www.webmd.com/children/vaccines/news/20211202/malaria-vaccine-milestone-hurdles>

Achievements

STUDENT ACHIEVEMENTS

- 4 students of M.Sc batch 2019-2021 have been recruited in positions such as Project associate, Technical assistant and Scientific article editor by Central Animal Facility : IISc Bangalore, Central Institute of Freshwater Aquaculture(CIFA), Omics Publishing House, Hyderabad and RamaDevi Women’s University.

- 6 students of M.Sc batch 2020-2022 have been awarded with the P.G. MERITORIOUS SCHOLARSHIP, Institute of Mathematics & Applications, Odisha (Selection criteria : Written Test).

Science Stories

FIRST MALARIA VACCINE A MAJOR MILESTONE DESPITE HURDLES AHEAD

In October of this year, the World Health Organization endorsed the first-ever malaria vaccine, the protein-based RTS,S/AS01. The four-dose vaccine, advanced by landmark COVID-19 prevention efforts, is a major milestone that scientists have painstakingly worked for decades.

SYNTHETIC ORGANELLES LET RESEARCHERS CONTROL CELL BEHAVIOR

Eukaryotic cells' contents are organized into various compartments, including membraneless organelles formed by a process known as liquid-liquid phase separation. Researchers have experimented with creating artificial versions of these compartments to control various aspects of cell biology—blocking particular cellular reactions, for example, or creating new sites for protein translation. Now, a team led by Matthew Good at the University of Pennsylvania Perelman School of Medicine has combined several recent advances into a technique for creating membraneless organelles that reversibly store and release specific intracellular cargo, letting researchers control cell behavior even more finely than before.

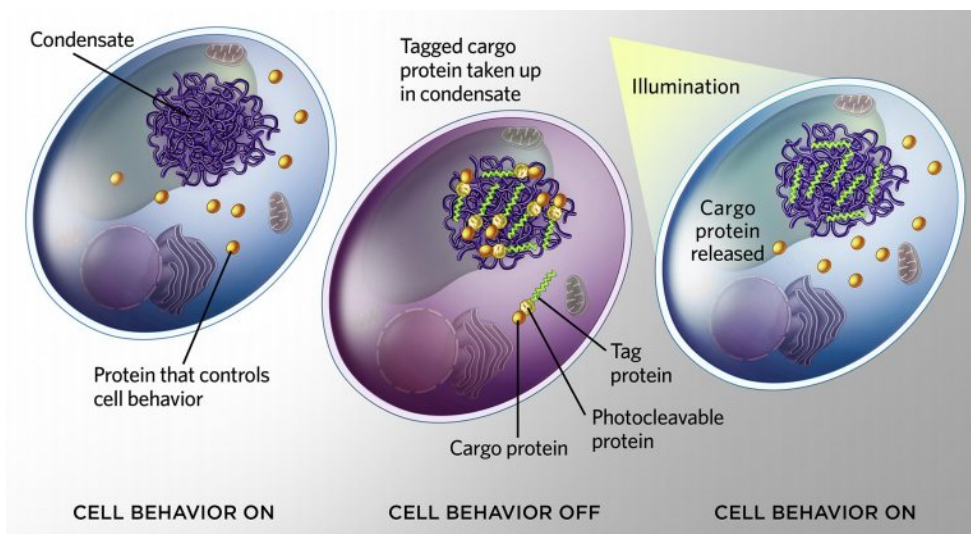
To make the organelles, Good's team engineered yeast (and later human cells) to produce a tweaked version of a protein from the worm *C. elegans* that would spontaneously coalesce to form droplets, or condensates, in the cell cytoplasm. Then, to mark particular peptides as cargo for these artificial organelles, the researchers edited cells' DNA to create versions of these peptides that possess a tag—that is, another protein that interacts with the ones making up the condensates. Observing the setup in vivo using fluorescent labeling and microscopy, the team found that up to 90 percent of tagged cargo proteins were sequestered into the droplets.

Next, the researchers used the technique to control cell behavior. Tagging Cdc5, a protein required for cell division, so it would be taken up into the organelles stopped cells from proliferating, for example.

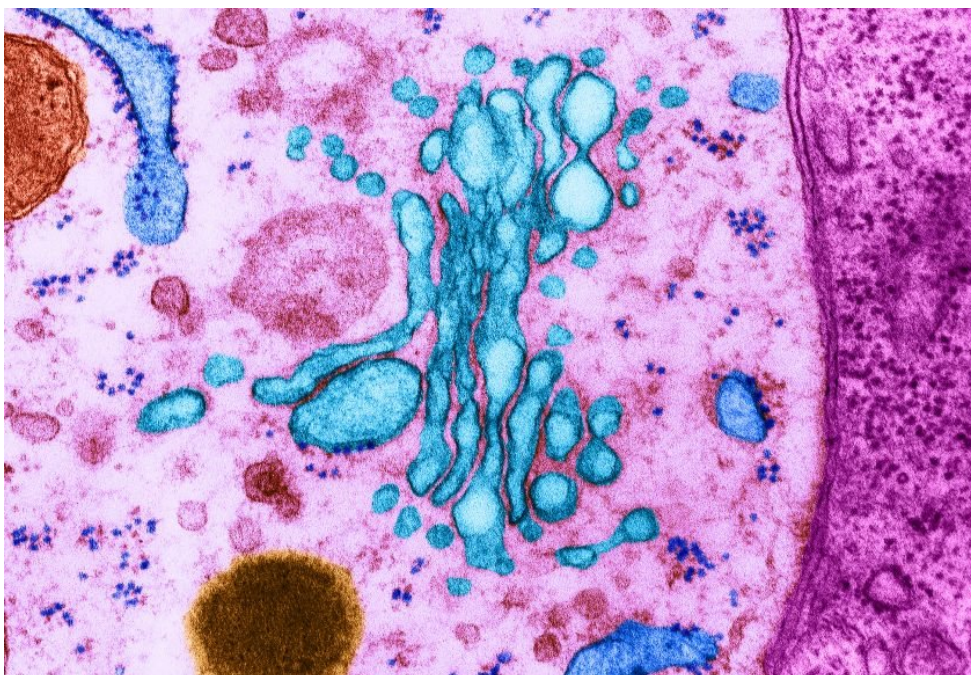
For more details, go to :
<https://www.the-scientist.com/modus-operandi/synthetic-organelles-let-researchers-control-cell-behavior-69248>



SARS -COV-2 Variants
Source : EUROPEAN SCIENCE-MEDIA HUB



Flipping the Cell's behavior | Source : The Scientist



Organelles under the microscope | Source : National Geographic

RESEARCHERS STUDY A NEW WAY TO TREAT SICKLE CELL DISEASE

This year saw a small but important advance in the treatment of sickle cell disease, a group of inherited disorders that cause red blood cells to become sickle shaped and can lead to anaemia. A drug developed to treat an enzyme deficiency (pyruvate kinase) was found to improve anaemia and reduced acute episodes of severe pain in sickle cell disease.

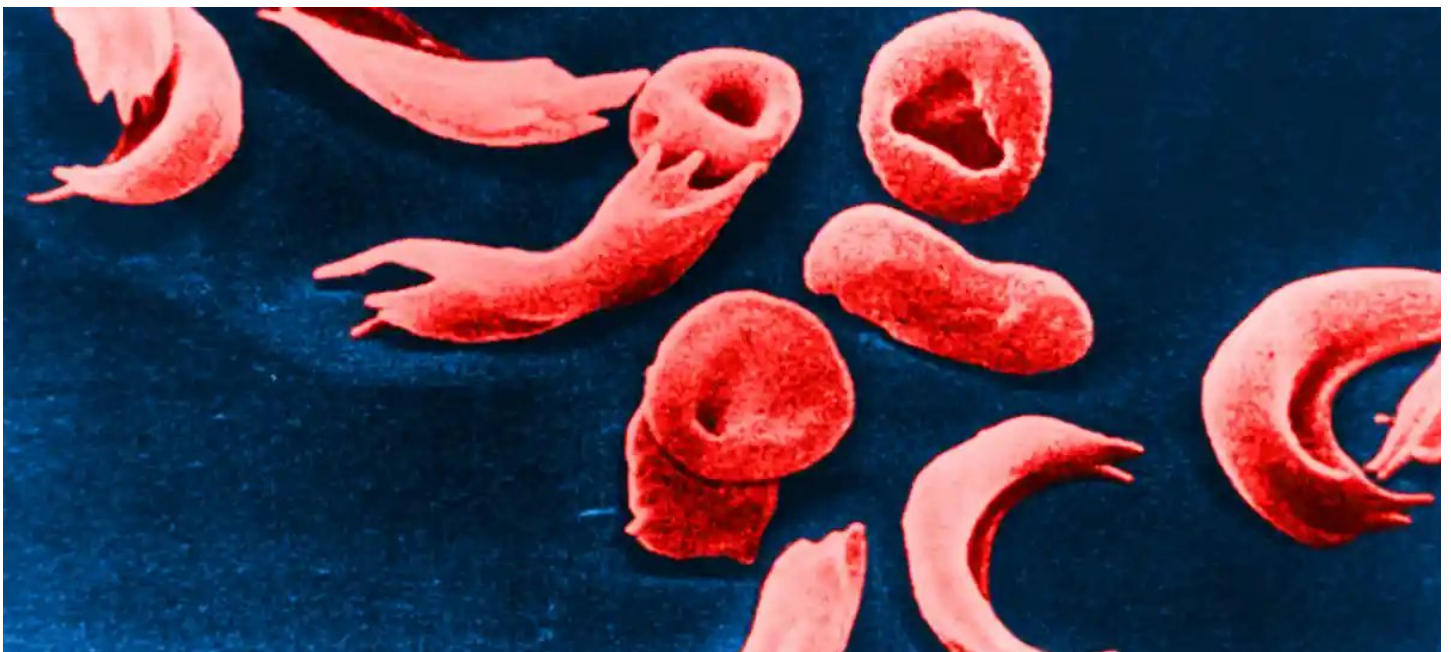
While the research is still in its early phases, the researchers point out that their breakthrough came from looking

at the characteristics of people with sickle cell disease rather than focusing only on their red blood cells.

This development has been found to benefit people with other conditions and brings hope to millions of people worldwide, but predominantly in Africa, the Indian subcontinent and South America. or people living with SCD, acute pain is so severe that it is called a “crisis.” Sickled red blood cells are also highly fragile and have a short life span.

Therefore, people living with SCD experience anemia throughout their life. To prevent pain crises and alleviate anemia in people living with SCD, researchers, including those in our group, have been studying new ways to prevent blood cells from sickling. We believe that reducing sickling should also improve anemia as red blood cells will be less likely to breakdown.

For more details, go to :
<https://www.nhlbi.nih.gov/news/2022/researchers-study-new-way-treat-sickle-cell-disease>



A scanning electron microscope image of red blood cells affected by sickle cell disease. A new treatment for the condition may soon be available. Photograph: Science History Images/Alamy

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