Mehta Family Centre for Engineering in Medicine

Annual Report 2023

Contents .....

Message

Prof. NITIN GUPTA,
Coordinator MFCEM

The year 2023 ended on a high note with the inauguration of the Mehta Family Centre for Engineering in Medicine. The journey, from inception of the idea to its realization as an interdisciplinary centre aimed to facilitate engineering solution to medical problems, has been a lesson in vision building, teamwork, outreach and collaboration.

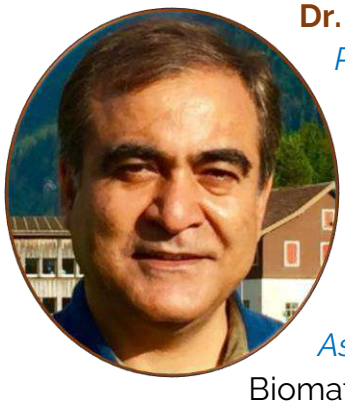
MFCEM has been made possible by the generous support of Shri Rahul Mehta of the Bhupat and Jyoti Mehta Family Foundation and the guidance of Prof. Shankar Subramaniam, UCSD, aided by a very able advisory board.

I strongly believe that MFCEM would greatly benefit from the existing strengths and leaderships in biological sciences and diverse engineering domains at IIT Kanpur. Currently the MFCEM hosts 31 faculty from varied disciplines, such as, Biological sciences, Chemistry, Chemical engineering, Computer science and engineering and Cognitive sciences. The proximity of diverse fields would encourage collaborative and innovative solution to existing medical problems. The students working at MFCEM will receive interdisciplinary training and opportunities for both fundamental and translational research.

I would also like to highlight that MFCEM would be housing a research wing under the Industry-Academia partnership between Laurus Labs and IIT Kanpur. It marks a beginning of industry-first investment in faculty research, to facilitate development and progression through pre-clinical trials of Adeno-associated virus (AAV)-based gene therapy vectors.

Awards / Honors / Recognitions

Tata Innovation Fellowship DBT India. *Prof. Dhirendra S. Katti* was awarded the Tata Innovation Fellowship which honors scientists involved in translational research through innovative scientific knowledge and platform technologies.



Dr. Nandagudi Suryanarayana Rao Academic Award. *Prof. Ashok Kumar* was awarded by the National Academy of Medical Sciences (NAMS) for the year 2023. The award is in recognition of his outstanding contribution to the field of medical sciences.

Distinguished Biomaterials Scientist Award. *Prof. Ashok Kumar* was awarded the Distinguished Biomaterials Scientist Award by the Society of Biomaterials and Artificial Organs, India (SBAOI)—for his seminal contribution in the areas of functional cryogel biomaterials and bone substitutes in regeneration.

S. Ramachandran National Bioscience Award. *Prof. Nitin Gupta* was awarded the prestigious S. Ramachandran National Bioscience Award for Career Development.

Awards / Honors / Recognitions

Distinguished Teacher Award, IIT Kanpur. *Prof. Ramasubbu Sankararamakrishnan* was awarded the Distinguished Teacher Award, 2023.

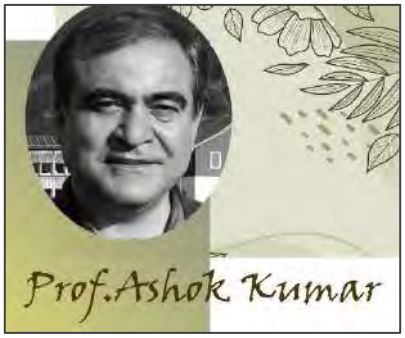
INAE-SERB Abdul Kalam Technology Innovation National Fellowship. *Prof. Sandeep Verma* was awarded the INAE-SERB Abdul Kalam Technology Innovation National Fellowship.

Infosys Prize 2023. *Prof. Arun Kumar Shukla* was awarded the Infosys prize, 2023 in Life Sciences for his pathbreaking contributions to the field of G-protein coupled receptor (GPCR) biology.

Awards / Honors / Recognitions

Elected President/Chair/Board member

President of the Society for Biomaterials and Artificial Organs – India.



Prof. Ashok Kumar has been elected as the President of the prestigious Society for Biomaterials and Artificial Organs India.

Society for Biomaterials & Artificial Organs (India)

The SBAO is a non-profit professional organization and is a member of the International Union of Societies for Biomaterials Science and Engineering (IUS-BSE). The primary objective of SBAOI is to cultivate an ecosystem nationwide for the growth of fundamental and technology-oriented research in Biomaterials and Artificial Organs and to serve as platform for the stakeholders, like clinicians, industry professionals, together with researchers from academia and national labs.

President of the Society for Biomaterials and Tissue Engineering Society India

Prof. Dhirendra S. Katti has been elected as Presidents of the prestigious Biomaterials and Tissue Engineering Societies of India.

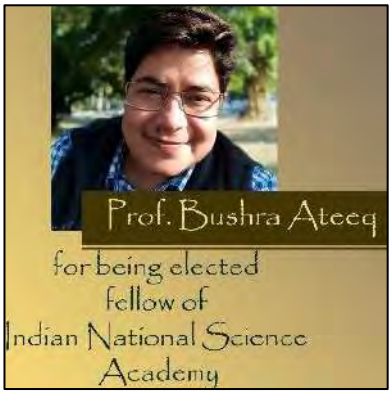
STERMI
Society For Tissue Engineering & Regenerative Medicine (India)

The society for tissue engineering and regenerative medicine India (STERMI) is a charitable society under the Travancore Cochin Literary Scientific and Charitable Societies with a basic objective to integrate Tissue Engineering and Regenerative Medicine to enhance the health care system and bring interdisciplinarily and scientists together for improving the related R&D in India.

Awards / Honors / Recognitions

Fellow of Academy

Indian National Science Academy. *Prof. Bushra Ateeq* was elected Fellow Of Indian National Science Academy



Board Members

Prof. Bushra Ateeq**,**
Elected External Member Senate of the NIPER-Raebareli (Sept 2023 – Sep 2026) approved by the Board of Governors of NIPER-Raebareli.

Member, Academic & Research Programme Advisory Committee 2023 of Satyendra Nath Bose National Centre for Basic Sciences, Salt Lake, Kolkata

Prof. Jayandharan Rao
Elected member Board of Studies, School of Health Science and Technology, VIT, Vellore.

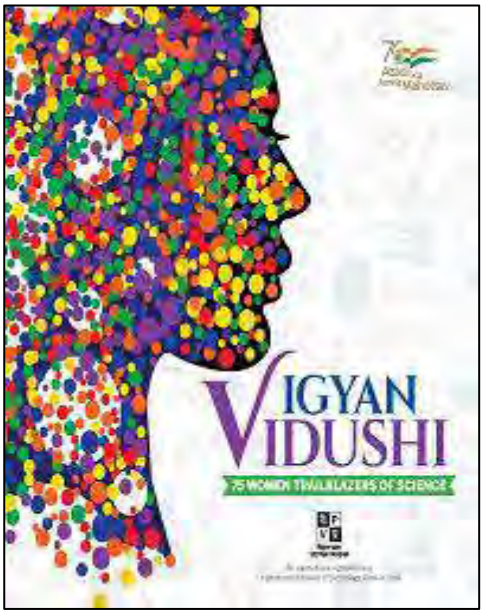
Selected Expert Committee (SEC) on Biomanufacturing for the subsector - Precision Biotherapeutics: Cell and Gene Therapy. 2023

Selected Expert Member, Program Advisory Committee (PAC), CRG, SERB, India. 2023

Inducted in Faculty Selection committee, Pandit Deendayal Energy University, Gandhinagar. 2023

Awards / Honors / Recognitions

Features



- ***Vigyan Vidushi- 75 Women Trailblazers of Science***.

Prof. Bushra Ateeq was featured in a compendium compiled and released by the Vigyan Prasar, DST on National Science Day (28th February 2023) on 75 Women Trailblazers of Science.

- **The Torchbearers of Indian bioscience-** Profiling India's Top 20 Promising Bioscience Innovator. *Prof. Bushra Ateeq* was featured in the BioVoice eMagazine March 2023 as one of India's Top 20 Promising Bioscience Innovators.

- **Shepreneurs Women to Watch.** *Prof. Bushra Ateeq* was featured in the special issue of March 2023 of Entrepreneur India magazine.

Chair

Prof. Jayandharan G. Rao was accorded the Chair 2023, Global outreach Committee **2023,** American Society of Gene and Cell Therapy, Washington DC, USA, accorded to

Prof. Jayandharan G. Rao was accorded the Chair 2023, Training sub-committee, Education and outreach Committee, International Society of Thrombosis and Hemostasis, USA.

Awards / Honors / Recognitions

Fellowships and Grants

Prof. Sandeep Verma

- **Sponsor/Agency:** Indian National Academy of Engineering (Abdul Kalam Technology Innovation National Fellowship)
  Title: Chemically Engineered Thermostable Human Insulin for Diabetic Patients
  Role: Principal Investigator

- **Sponsor/Agency:** Ministry of Education (STARS Scheme)
  Title: Development of nitric oxide releasing multifaceted biomaterial based-approach for infected diabetic wounds
  Role: Principal Investigator

Prof. Jayandharan Rao

- **Sponsor/Agency**: Wellcome Trust DBT Team Science Grant (Rs. 998 Lakhs)
  Title: Next generation AAV vectors for Duchenne Muscular Dystrophy gene therapy
  Role: Principal Investigator

- **Sponsor/Agency**: Laurus lab-IITK consultancy
  Title: Development of cGMP facility at IITK
  Role: Principal Investigator

Awards / Honors / Recognitions

Fellowship and Grants

Prof. Bushra Ateeq,

Sponsor/Agency: Transformational and Advanced Research in Sciences (STARS); Ministry of Education; Indian Institute of Science, Bangalore.

Title: Targeting oncogenic transcription factor ERG in prostate cancer by employing HBS-α-helicomimics technology. Role: Principal Investigator.

Role: Principal Investigator

Patents

Inventor: Jayandharan GR, Pathak S.
Title: AAV-mediated suicide gene therapy for the treatment of breast cancer.
Application No. 202311056680.

Inventor: Jayandharan GR, Shamshul Huda, Pratiksha Sarangi.
Title: Modified AAV vectors for enhanced gene therapy in hemophilia A and hemophilia B.
Application No. 202311062115.

Inventor: Dr. Dhirendra S. Katti, Dr. Namrata Baruah, Dr. Nadim Ahamad
Title: A highly stable therapeutic protein antigen having vaccine application against shigellosis, and a simple and cost-effective method for preparing the same.
Application No. 455359. Status: Granted.

Inventor: Dr. Dhirendra S. Katti, Dr. Namrata Baruah, Dr. Nadim Ahamad
Title: A highly stable therapeutic protein antigen having vaccine application against shigellosis, and a simple and cost-effective method for preparing the same.
Application No. 455359. Status: Granted.

Inventor: Dr. Dhirendra S Katti, Dr. Neha Arya, Mr. Viren Sardana, Mr. Prashant Jha
Title: A method for tumoroid generation using 3-d chitosan-gelatin scaffolds for anti-cancer drug screening
Application No. 443023. Status Granted.

Inventor: Dr. Dhirendra S Katti, and Arijit Bhattacharjee
Title: A combination comprising sulfated carboxymethylcellulose and tissue inhibitor of metalloprotease 3 (timp3) for osteoarthritis
Application No.420443. Status: Granted

Inventor: Dr. Dhirendra S Katti, and Arijit Bhattacharjee
Title: A combination of anti-catabolic and pro-anabolic agents for the treatment of osteoarthritis
Application No. 459100. Status: Granted

Inventors: Dr. Bushra Ateeq, Shivansh Nigam.
Indian Provisional Patent, Indian Institute of Technology, Kanpur.
Title: "A Method For Diagnosis of DKC1 Positive Colorectal Cancer".
Application No. 202311017633.

Inventor: Dr. Jayandharan GR, Pratiksha Sarangi, Mohankumar BS, Narendra Kumar G.
Title: AAV mediated NEAT1 knockdown in combination with F8 gene augmentation for treatment of haemophilic arthropathy.

Application No. 202311044001.

Inventor: Dr. Dhirendra S Katti, Arijit Bhattacharjee
Title: A combination comprising sulfated carboxymethylcellulose and tissue inhibitor of metalloprotease 3 (timp3) for osteoarthritis
Application No.420443 Status: Granted.

Inventor: Dr. Dhirendra S Katti, Namrata Baruah
Title: A Shigella nanovaccine and process for synthesis thereof
Application No. 433684 Status: Granted

Endowed / Invited Lectures

Prof. Sandeep Verma

- Invited talk, FORCE-IICE 2023 Conference, Kathmandu.
- Co-organized the 1st IIT Kanpur-La Trobe University Workshop, Melbourne. November 2023.
- Invited talk for the 5th Prof. G. B. Behera Endowment Lecture, Sambalpur University, Odisha

Prof. Dhirendra Katti

- Invited talk **in SOARCON** on Mesenchymal stem cell-based improved hyaline cartilage engineering.
- Plenary speaker in the 108th Indian Science Congress. Science and Technology for sustainable development with women empowerment. He delivered a talk titles Development of a vaccine for multi-drug resistant Diarrhea- An interesting journey**.** Jan 2023.
- Invited lecture, Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar. June 2023.

Prof. Jayandharan Rao

- Co-Chair and presenter, Training the trainers, ASGCT-Mumbihili University, Tanzania. 2023
- Co-Chair, 26th ASGCT Annual meeting, Los Angeles, Session on Fostering Global Collaborations to Advance Gene and Cell Therapy Research in LMICs. June 2023
- Resource person for Training program for CDSCO drug inspectors on "Regenerative medicine and gene therapy", National Institute of Health and Family Welfare, New Delhi.
- Invited talk: Foresight, Center for Cellular and Molecular Platforms, Bengaluru.
- Invited lecture, President's plenary, Indian Association of Medical Genetics, New Delhi. December 2023.
- invited lecture for the Mehta Family Center for Engineering in Medicine Inaugural and Research symposium, IIT Kanpur. November 2023

Endowed and Invited Lectures

Prof. Bushra Ateeq

- CNR Rao Endowed Lecture Series Prof. Bushra Ateeq was invited to deliver the prestigious CNR Rao CNR Rao Endowed lecture. IIT Kanpur**.** January 2023
- Invited Talk at the 45th All India Cell Biology Conference & International Symposium on Biology of Development and Disease at the Banaras Hindu University. January 2023.
- Invited Talk at the IISER Bhopal organized by the Department of Biological Sciences, Annual Biology Meeting. January 2023.
- Invited Talk at the Joint Symposium organized by Departments of Chemistry and Biological Sciences (CBM), IISER Bhopal. February 2023.
- Invited talk as Chief Guest at the 8th Institute Research Scholar Day, IIT Hyderabad. March 2023.
- Invited talk at the "Symposium on S20-Aligned Focal Themes: Energy, Health and Society" organized by Indian National Science Academy (INSA), Kanpur-Lucknow chapter. March 2023.
- Invited talk at the Kusuma School of Biological Sciences, IIT Delhi, March 2023.
- Invited Talk at the Institute of Bioinformatics and Applied Biotechnology (IBAB), Bangalore on 20. 05. 2023.
- Invited Talk at the Aurigene Oncology Limited; Electronics City Phase II, Bangalore. June 2023.
- Invited talk 82 Annual Meeting of Japanese Cancer Association (JCA), Yokohama, Japan. She chaired a session on model organism for cancer research. September 2023
- Invited talk at the Department of Biological Sciences (DBS@60), Tata Institute of Fundamental Research, Mumbai.
- Invited talk at the Indian Cancer Genome Atlas (ICGA) conference. IISER Pune. October 2023
- Invited lecture as a part of the Faculty of Science Refresher's course at the Integral University, Lucknow. October 2023.
- Attended Guha Research Conference (GRC) November 2023 Swaraj Deep Havelock.
- Invited talk at the IIT Kanpur-La Trobe Research Academy Workshop, at the La Trobe University, Melbourne. November 2023
- Invited talk at the Bio21 Institute of Molecular Science and Biotechnology, University of Melbourne on 29th November 2023.
- Invited Talk at the Indian National Science Academy (INSA), Delhi 89th Anniversary General Meeting co-hosted by the three CSIR institutes – the Centre for Cellular and Molecular Biology (CCMB), the Indian Institute of Chemical Technology (IICT) and the National Geophysical Research Institute (NGRI) at Hyderabad. 7th December 2023

Highlight: Industry-Academia partnership

In a breakthrough Industry-Academia partnership, a gene therapy technology developed by **Prof. Jayandharan Rao** and team involving the use of Adeno-associated virus (AAV)-based gene therapy vectors for optimal gene delivery, has been licensed to **Reliance Life Sciences Pvt. Ltd.** Application of the technology would lead to developing path breaking treatments for addressing many genetic eye disorders and hereditary eye diseases.

Gene therapy using viral vectors has emerged as a potent tool in the field of molecular medicine. Use of the technology developed by Prof. Jayandharan Rao and team at IIT Kanpur to Reliance Life Sciences represents a significant step forward in developing innovative solutions to address unmet medical needs.

Further a Memorandum of Agreement (MOA) between IIT Kanpur with **Laurus Labs** for this novel gene therapy was made earlier this month. This Industry-Academia partnership marks a illustrious beginning of **industry-first investment in a faculty research** group. In accordance with the MOA, IIT Kanpur will transfer several gene therapy assets through in-licensing to Laurus Labs, who will provide a research grant to facilitate their progression through pre-clinical development.

Laurus Labs will also fund the necessary clinical trials and spearhead the launch of these cutting-edge products not only in India but also in emerging markets. In addition, Laurus Labs will establish a state-of-the-art Good Manufacturing Practice (GMP) facility at IIT Kanpur's Techno Park, bolstering the production capabilities of gene therapy products.

MFCEM welcomes....

Debanjan Dasgupta

Assistant Professor

Dr. Dasgupta's research interest lies in the areas of Neurophysiology, Circuits and Systems Neuroscience, and Electrophysiology. He is keen to explore the neuronal circuits that underlie multiple behavioral patterns in the healthy and diseased brain.

Dr. Debanjan did his Ph.D. in Neuroscience from Molecular Biophysics Unit, Indian Institute of Science, Bangalore. Following that, he joined The Francis Crick Institute, London and University College London as a postdoctoral fellow, under the guidance of Prof. Andreas Schaefer, where he studied the olfactory system and showed that mammals can perceive temporally dynamic odour stimuli. Prior to joining IIT Kanpur in June 2023, he worked as a Senior Research Fellow at UK Dementia Research Institute, UCL.

Sai Chaitanya Chiliveri

Assistant Professor

Dr. Chiliveri's primary research interest is to investigate host-pathogen interactions at the molecular level and utilize this information for designing therapeutic interventions. To achieve these goals, his research employs a multidisciplinary approach, involving molecular biology, biochemical methods, and advanced biophysical techniques, including NMR spectroscopy.

Dr. Chiliveri earned his Bachelor of Technology in Biotechnology from Chaitanya Bharathi Institute of Technology, Hyderabad, in 2009. In 2016, completed his Ph.D. in Biophysics at the Centre for Cellular and Molecular Biology, under the guidance of Dr. Mandar Deshmukh. Following his doctoral studies, Dr. Chiliveri pursued postdoctoral training with Dr. Ad Bax at the National Institutes of Health.

MFCEM-BSBE Joint Seminar

- Dr. Abhinav Dubey, Postdoctoral Research Associate, Harvard Medical School, USA,
  Title: Studying structure, dynamics, and interactions of biomolecules in near-native conditions. Date: 6th January 2023

- Dr. Sumeet Pal Singh, IRIBHM, part of ULB in Brussels, Belgium
  Title: Hepatic lipid flux damages the liver during starvation-induced steatosis; Date: 7th February 2023

- Dr Debojyoti Dhar, the co-founder and Director of South Asia's first microbiome company, Leucine Rich Bio Pvt Ltd
  Title: Gut microbiota profiling - Insights from an Indian Startup; 15th February 2023

- Dr. Apurva Ratan Murty, Research Scientist at the Massachusetts Institute of Technology, USA
  Title: Navigation in the human brain; Date: 21st February 2023

- Dr. Latika Nagpal, Postdoctoral Research Associate, The Johns Hopkins University School of Medicine, Baltimore, USA
  Title: Redox mechanisms governing Neurodegenerative Diseases, Date: 20th March 2023.

- *Dr. Sandeep Kumar Kalva*, Postdoctoral Research Associate, University of Zurich and ETH Zurich, Switzerland.
  Title: Acoustic sensing of light: Photoacoustic/optoacoustic tomography for deep tissue interrogation. 19th April 2023

- Dr. Vimal Prabhu Pandiyan, Department of Ophthalmology, University of Washington, Seattle, United States,
  Title: Assessment of Cellular Scale Retinal Function in Healthy and Diseased Eyes Using Optoretinography. 3rd May 2023.

- Dr. Saurav Kumar Jha. Mokpo National University, South Korea
  Title: Preparation and evaluation of oral docetaxel and etoposide nano formulations for the treatment of cancer. 11th May 2023.

- Dr. Nikunj Bhagat, Ramalingaswami Fellow at IISc Bangalore, India.
  Title: Measurement, Analysis, & Interpretation of Biosignals: EEG and ECG. 9th May 2023.

- Dr. Kuldeep Mahato, Post-doctoral scholar Department of NanoEngineering, University of California San Diego, USA
  Title: Advances in Biosensing and Bioelectronics for Personalized Wellness and One Health. 10th May 2023.

MFCEM-BSBE Joint Seminar

- Dr. Avik Samanta, DFG-funded Scientist at the University of Mainz, Germany.
  Title: Signal Processing and Functional Adaptation in Life-Inspired Soft Matter Systems. 15th May 2023.

- Dr. Subhashis Pal, post-doctoral researcher, Department of Medicine, Emory University, Atlanta, GA, USA.
  Title: Metabolic Bone Disease and Osteoimmunology: A Tale of Four Studies. 17th May 2023.

- Dr. Devivasha Bordoloi, a post-doctoral fellow at the Vaccine and Immunotherapy Center, The Wistar Institute, Philadelphia, USA.
  Title: Novel biologics targeting surface expressed Follicle Stimulating Hormone Receptor (FSHR) for targeted ovarian cancer immunotherapy. 29th May 2023.

- Dr. Gaurav Pandey. National Innovation Foundation India.
  Title: Riboflavin (Vitamin B2) as an internal biomarker for biosensing and quality monitoring. 21st June 2023.

- Dr. Vaithish Velazhahan, MRC Laboratory of Molecular Biology, UK
  Title: What turns on a fungus? Understanding arousal at the atomic level. July 24th 2023

- Dr. Sudhir Thakurela, a faculty at Massachusetts General Hospital and Harvard Medical School, United States. 18th August 2023;

- Dr. Srini Kaveri, represents CNRS, as the Director of New Delhi Bureau at the French Embassy.
  Title: Passive Immunotherapy? Not so passive after all…. 30th August 2023

- Dr. Himanshu Verma, Ph.D from Department of pharmaceutical engineering and technology, IIT BHU
  Title: Myocardial Infarction Comorbid Depression induced by Chronic Unpredictable Stress and Maternal Separation in Rats. 4th Sep 2023

- Dr. Mounika Gosika, Assistant Professor, Department of Physics, School of Advanced Sciences, VIT Vellore, India
  Title: Basic Concepts of Biomolecular Modelling Using Molecular Dynamics. 12th September 2023

BSBE MFCEM & Chemistry Joint Colloquium

- Dr. Jeremy N. Burrows Medicines for Malaria Venture, Geneva, Switzerland
  Title: Antimalarial Drug Discovery: Challenges and Progress. 13th March.

- Prof. Saman Habib, CSIR-Central Drug Research Institute, Lucknow
  Title: A unique evolutionary event and targets for intervention against malaria.

MFCEM events

MFCEM Dialogues

Matt Abrahams, Stanford Graduate School of Business, *on Tools and techniques for effective communication*

Matt Abrahams is a globally acknowledged trainer and teacher of communication and organizational behavior, at the Stanford Graduate School of Business.

In the online session on "Tools and techniques for effective communication", Matt touched upon many relevant and highly pertinent issues on good communication.

The session was jointly chaired by Mr. Rahul Mehta, The Bhupat & Jyoti Mehta Family Foundation; and Prof. Nitin Gupta, IIT Kanpur.

Matt Abrahams set the stage highlighting the importance of communication and defining communication as "Operationalized Leadership". He further elaborated that communication is essentially how we make "common" our ideas, beliefs, and goals.

Matt explained at length how anxiety is "innate to being human" and counterintuitively, acts to energize and focus. He also shared many valuable tips on how to overcome anxiety by addressing a) the symptoms and b) the cause of anxiety, such as by deep breathing, listening to music and word/number games.

His strongly advice was to be "in the present" and not be overwhelmed by the consequence or future stakes involved, a tested means to keep the jitters away.His

talk was followed by a vibrant Question/Answer session with the audience and a quiz session with the students.

Winners of the Interactive session with Matt Abrahams

The MFCEM Dialogue conducted by Matt Abraham, ended with an interactive session with the students, who were encouraged to ask questions related to effective communication. From them Matt Abrahams nominated 3 winners for the best questions asked.

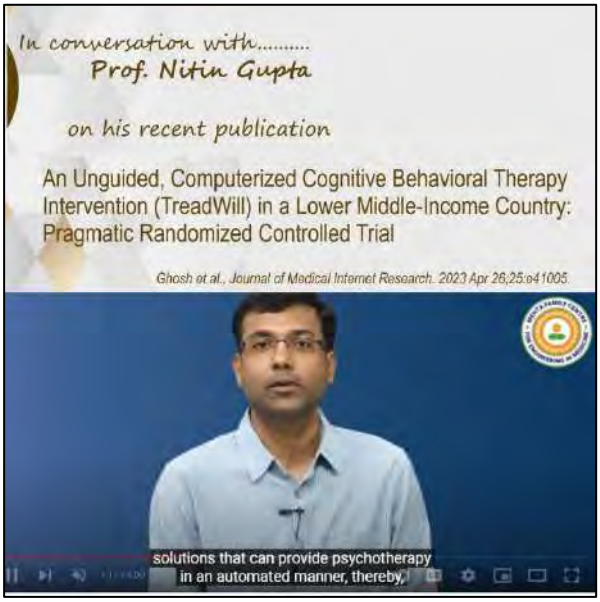
We congratulate the winners for their enthusiastic participation!

MFCEM Flash Talks

MFCEM faculty provided a glimpse of their published work

Prof. Nitin Gupta talks about his recent study, Prof Nitin Gupta talks about his recent published study on developing a new unguided Computerized Cognitive Behavioral Therapy (cCBT)-based intervention: TreadWill; and how its use significantly reduces anxiety and depression in users. The study was published in J Med Internet Res, April 26 2023.

https://www.youtube.com/watch?v=kD0-amDM3JQ



Prof. Dhirendra Katti discussed his recent published works, ranging from developing a nano-vaccine for Shigellosis, to nanoparticle-based drug delivery system for cancer, to developing innovative remedies for osteoarthritis.

https://youtu.be/aQfEsvp2ufE

MFCEM Flash Talks

Prof Jonaki Sen talked about her recent study on forebrain development in chick embryo. Prof. Sen discussed how her team identified novel downstream mediator of retinoic acid signaling required for invagination of forebrain roof plate, and how this study could help better understand certain defects leading to cerebral malformation in humans.

https://www.youtube.com/channel/UCjmDrSkNVS_IIZ5k0j6oy-A

Prof Pragathi Balasubramani provided an overview of her recent study on how distinct neural processes serving reward frequency versus magnitude maximization are activated during decision-making.

https://www.youtube.com/watch?v=f4WrW_xQX90

MFCEM WORKSHOP

Startups- How to START, SUSTAIN and SUCCEED

RASHIE JAIN, Co-founder & CEO Onco.com

RASHIE JAIN, is an entrepreneur, co-founder and CEO of Onco.com, a healthcare technology company focused on providing end-to-end care management to cancer patients.

Rashie did her BTech in Biological sciences and Bioengineering from IIT Kanpur and later an MBA in healthcare management from Wharton School

She shared on how she recognized a lack of technology penetration in the healthcare space, particularly, a substantial information gap in cancer diagnostics, treatments and palliative care. It is then that she along with Dr. Amit Jotwani founded **Onco.com** in 2017 to alleviate plight of cancer patients and their caregivers.

Rashie Jain shared the importance of reaching out to capable mentors, and domain experts, who could provide valuable advice, key to getting started.

Rashie encouraged students interested in entrepreneurship to start early and young. She briefed the listeners on many schemes: government, public and private angel funders who could be a valuable source of initial startup fundings.

The Entrepreneur, recognized Rashie Jain for her outstanding contributions in the field and listed her as "35-under-35" promising entrepreneur to look out for,

MFCEM WORKSHOP

immunitoAI: A Life Science Entrepreneurship

Dr ARIDNI SHAH, Co-founder & CEO immunitoAI

Dr ARIDNI SHAH is the Co-Founder and CEO of **immunitoAI**. She has a PhD in Biological Sciences from NCBS, TIFR and is a

At immunitoAI novel antibody therapeutics with pre-defined drug properties are discovered, using AI-based bottom-up approach..

The AI-platform is built to be capable of generating *de novo* antibody and antibody fragments against any epitope and does not depend upon a biological source, for the lead molecule.

immunitoAI has been selected to participate in the TechCrunch's Startup Battlefield, 2023 in San Francisco.

Dr. Shah provided an overview of the technology /science behind immunitoAI, use of AI to develop antibody-based therapeutics and shared her academic-to-entrepreneur journey.

Dr. Shah emphasized the importance of preparing oneself before venturing into a lifescience startup, and encouraged building partnerships that would enhance complementary skill sets. Further she recommended that one must also take into account the scalability of the idea.

Finally Aridni cautioned young reserachers that unlike tech startups, lifescience startups require longer incubation period, and would require a longer time to break even.

Student Achievements

Sakshi Goel, PhD student of Prof. Bushra Ateeq, was awarded the **INSA Medal for Young Scientists 2022**, on her work in establishing the role of homeobox gene, DLX1 in prostate cancer & metastasis, and exploring it as a potential therapeutic target.

Deepak M. Khushalani PhD student of Prof. Nitin Mohan, has won the Best Poster Presentation Award at the Annual PMRF (Prime Minister's Research Fellowship) Symposium organized at IIT Madras on 17th & 18th February 2023.

Ankita Das PhD student of Prof. Ashok Kumar, was awarded the **best oral presentation** for "Elastomeric antioxidant cardioprotective patches: A paradigm bioengineered intervention" at the ACMR 2023. The conference was organized by PGIMER, Chandigarh under the aegis of international academy of cardiovascular sciences (India section) and International society for heart research (India section).

Student Achievements

Tanay Biswas, PhD student of Prof. Bushra Ateeq, has been selected for the Mehta Rice Engineering Scholars Program, an initiative of The Bhupat & Jyoti Mehta Family Foundation & Rice University. The MRESP is designed for exceptional graduate or undergraduate students to work alongside top researchers, inventors, & entrepreneurs at Rice University for a period of 4 months.

Jyoti Tripathi, PhD student of Prof. Pradip Sinha has received "Augmenting Writing Skills for Articulating Research (AWSAR) Award 2022" under the Best Stories in PhD category.

Sneha Gupta, PhD student of Prof. Ashok Kumar has received "Augmenting Writing Skills for Articulating Research (AWSAR) Award 2022" under the Best Stories in PhD category. The title of the story is "Backing the bone: Bringing peace to broken pieces".

Student Achievements

Triya Saha, PhD student of Prof. Ashok Kumar received the Bajpai-SAHA Student Award for the Best Oral presentation for the work titled "Digital Light Processing Based 3D Bioprinted Off-The-Shelf Exosome Laden Scaffold to Alleviate Non-Alcoholic Fatty Liver Disease in Animals" during the 33rd National Conference of the Society for Biomaterials and Artificial Organs, India (SBAOI) and the International Conference on Biomedical Materials and Technology" BioTEx 2023 Nov 29 to Dec 1, 2023 at the Indian Institute of Technology Delhi, India.

Zahra Sifat Zaidi, PhD student of Prof. D Katti, has received SBAOI Best Poster (Third prize) Presentation Award for her poster titled "Functionally graded hydrogels with dual biochemical cues for osteochondral tissue regeneration" during the recently concluded International Conference on Biomedical Materials and Technology BioTEx 2023, organized by SBAOI held from Nov 29- Dec 1, 2023, at the Indian Institute of Technology Delhi, Delhi, India.

Ekta Srivastava PhD student of Prof. Ashok Kumar has received the Best Oral Presentation Award at ICCM 2023: Indian Conference on Carbon Materials held at DAE convention centre, Mumbai, India, for her study titled: An electrically conducting nanofibrous "Electroband": Combinatorial approach to tackle nerve injury.

Student Achievements

Saptomee Chakraborty PhD student of Prof. Dhirendra Katti received ACS Best Poster Presentation Award for her poster titled "Adenosine and Quercetin combination therapy ameliorates osteoarthritis in ex-vivo goat/human OA cartilage" at the International Conference on Biomedical Materials and Technology BioTEx 2023, organized by SBAOI held from Nov 29- Dec 1, 2023, at the Indian Institute of Technology Delhi.

Ubaid Tariq, PhD student of Prof. Ashok Kumar was recipient of Best Poster Presentation Award for the work titled "Exosome Loaded Injectable and Adhesive Hydrogel Formulation For The Treatment of Myocardial Infarction" at the International Conference on Biomedical Materials and Technology" BioTEx 2023; Nov 29 to Dec 1, 2023 at the Indian Institute of Technology Delhi, India.

Student Achievements

Mohan Kumar BS, student of Prof. Jayandharan G Rao, has been selected as Prime Minister's Research Fellow (PMRF) 2023.

Mr. Mohan Kumar BS, a PhD student of Prof. Jayandharan Rao has been selected to receive a 2023 ASH Abstract Achievement Award (2023) for his abstract titled "Intraarticular Delivery of AAV5-Mir-125a-5p Regulates Key Molecular Mediators of Hemophilic Arthropathy" in the 65th ASH Annual Meeting & Exposition, San Diego, California during 9-12, Dec 2023.

Ms. Pratiksha Sarangi, PhD student of Prof. Jayandharan Rao has been selected for a poster presentation for her work titled "AAV based lncRNA and factor 8 gene therapy is therapeutic in a murine model of hemophilic arthropathy" the ESGCT 30th Annual Congress, Brussels on 24-27, Oct 2023.

Student Achievements

In conversation with…… Niveda Udaykumar on her published work:

CNKSR2, a downstream mediator of retinoic acid signaling, modulates the Ras/Raf/MEK pathway to regulate patterning and invagination of the chick forebrain roof plate. *Development*. 2023 Feb 15;150(3)

MFCEM: Hi Niveda, first and foremost congratulations on your publication!! Your study has unearthed yet unknown players in patterning of the brain hemispheres. Could you tell us in brief a little about these novel players?

Niveda Udaykumar: Thank you very much! Yes, our study has demonstrated the role of a gene known as *CNKSR2* in forebrain morphogenesis. We know that the brain comprises two hemispheres; during development, the hemispheres are formed by a process known as midline invagination of the roof plate, resulting in the separation of a single forebrain vesicle into two compartments (hemispheres). A previous study from our lab found that forebrain roof plate midline invagination is regulated by retinoic acid (RA) signalling, RA being a derivative of Vitamin A. Following up on this, we found *CNKSR2* to be expressed in the same domain as RA signalling in the chick forebrain, and through experiments, we proved that *CNKSR2* works downstream of RA signalling. Through further experiments, we found that the role of *CNKSR2* in the chick forebrain was to regulate cell proliferation as well as patterning in the midline and maintain low levels of another signalling pathway known as the Ras/Raf/MEK pathway. The low levels of Ras/Raf/MEK signaling in the midline is necessary to provide regional identities in terms of expression of key marker genes (patterning) and is also necessary for the process of midline invagination to occur properly, eventually leading to the formation of the brain hemispheres.

MFCEM: You have used chick as a model system? Does it provide any particular advantage and did you face any challenge, how did you overcome it?

Niveda Udaykumar: Yes, we have used the chick embryo for this study. The development of the chick embryo occurs outside the mother, providing access for manipulations at all stages of forebrain development, making it advantageous over mammals wherein the embryo develops in the mother's uterus. Also, the chick embryo is cost-effective and easily available too.

The only challenge that we face with the chick embryo is with the manipulation technique known as *in ovo* electroporation. This technique helps us to deliver

DNA molecules exogenously using an electric field. This technique requires high-end specialized equipment known as an electroporator and gives a reasonable efficiency of 50-70%. Hence, to overcome this, we must start by manipulating a high number of embryos to get a reasonable number for our assays and analysis.

MFCEM: Interestingly, one of the genes, *CNSKR2*, was uncovered in a genome-wide screen for metabolic genes. How did you traverse from there to it being implicated in forebrain roof plate invagination?

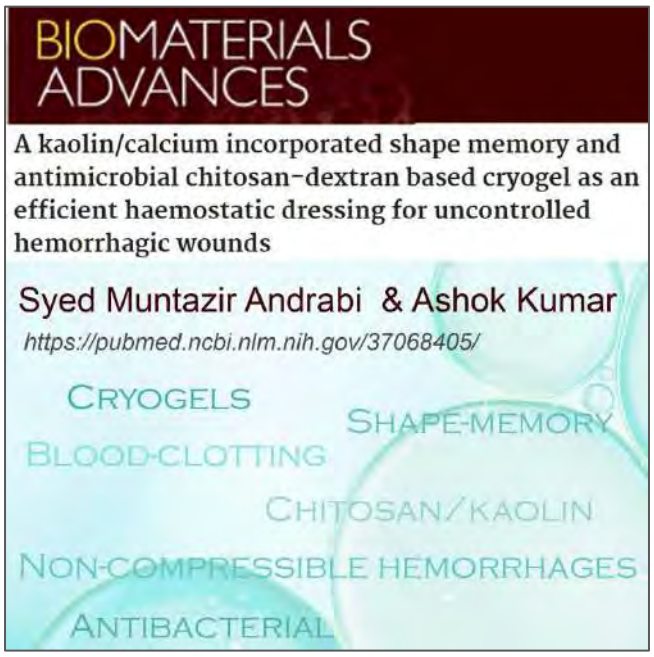
Niveda Udaykumar: In a previous study in our lab, we demonstrated that RA signalling is a novel regulator of the forebrain roof plate invagination process, and its blocking leads to invagination defects with a flat roof plate. Very interestingly, this flat roof plate is phenotypically like a congenital brain disorder known as holoprosencephaly. So, we were interested in finding out the mechanism(s) of how RA signalling regulates this process of midline invagination. When we profiled for the expression of *CNKSR2,* we found it to be expressed in the RA signalling domain during chick forebrain roof plate invagination. Therefore, we thought that one of the mechanisms through which RA signalling regulates midline invagination could be through *CNKSR2*. We performed experiments and found that *CNKSR2* is necessary in the forebrain roof plate for proper patterning and for the process of midline invagination to occur smoothly. Also, we found a novel inhibitory link between RA signalling and Ras/Raf/MEK signalling that is required for the underlying patterning and formation of the brain hemispheres.

MFCEM: We understand that the process of roof plate invagination is very tightly orchestrated and any defects can lead to congenital defects, also seen in humans, and unfortunately proving fatal. Does your study offer any diagnostic or therapeutic strategies that could be further explored?

Niveda Udaykumar: As we have performed our study in chick, the next step will be to see if *CNKSR2* regulates forebrain development in mice or rats, and then humans. Literature suggests that CNKSR2 may be involved in human brain development too, but in terms of diagnostic or therapeutics, further extensive investigation is required, as we are just beginning to understand the players/genes/signalling pathways involved in forebrain roof plate invagination and the consequence of its absence in during development.

Research Highlights

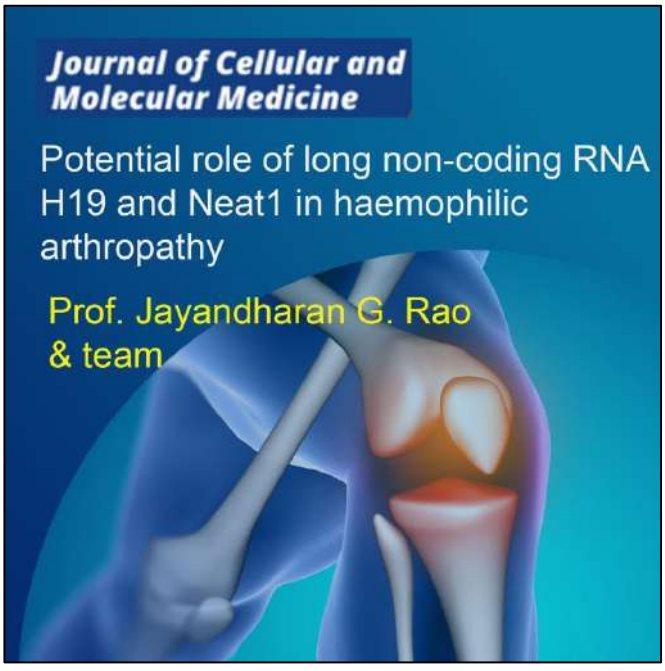
A kaolin/calcium incorporated shape memory and antimicrobial chitosan-dextran based cryogel as an efficient haemostatic dressing for uncontrolled hemorrhagic wounds. Andrabi SM, Kumar A. Biomaterials Advances. 2023



In an effort to mitigate damage due to incessant hemorrhage, **Prof. Ashok Kumar** and team have developed a cryogel with profound fluid absorption ability, rapid blood clotting and good antibacterial activity that can effectively inhibit bleeding from irregular and differently-compressible wound sites.

https://pubmed.ncbi.nlm.nih.gov/37068405/

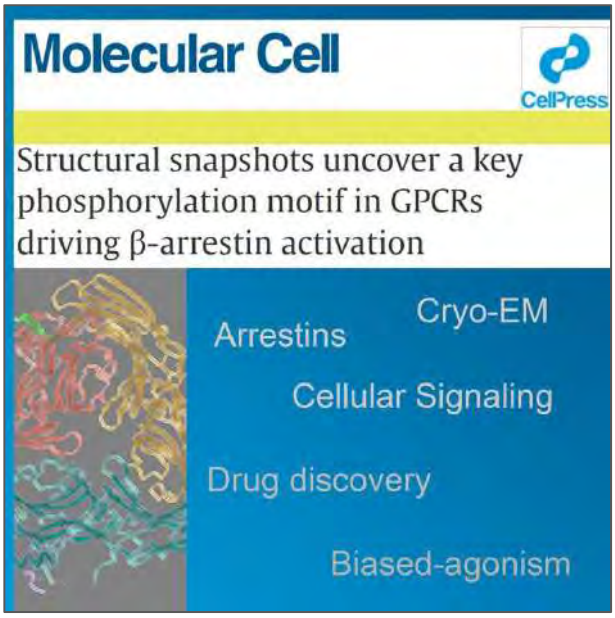
Potential role of long non-coding RNA H19 and Neat1 in haemophilic arthropathy. Sarangi P, Senthilkumar MB, Kumar N, Senguttuvan S, Vasudevan M, Jayandharan GR. Journal of Cellular and Molecular Medicine. 2023



Recurrent joint bleeding in hemophilic patients can lead to a painful condition of hemophilic arthropathy. Prof. Jayandharan Rao & team have identified, using a hemophilia mice model, key molecules that could be responsible for rapid degeneration of joint cartilage. The study opens up possibilities of using these as potential therapeutic targets to check the diseas progression.
https://pubmed.ncbi.nlm.nih.gov/37183540

Research Highlights

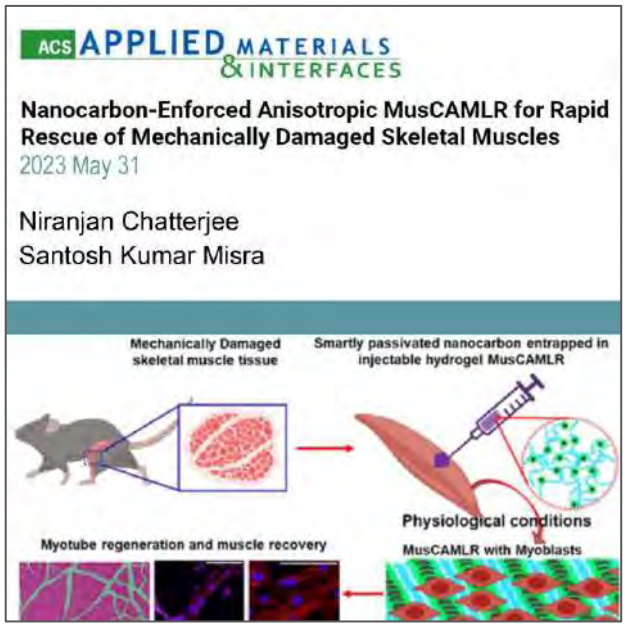
Structural snapshots uncover a key phosphorylation motif in GPCRs driving β-arrestin activation. Maharana J, Sarma P, Yadav MK, Saha S, Singh V, Saha S, Chami M, Banerjee R, Shukla AK. Molecular Cell. 2023 Jun 15;83(12):2091-107



How diverse phosphorylation patterns in GPCRs influence recruitment, activation, & functional outcomes of its interacting partners is key to a comprehensive understanding of GPCR Biology. Prof. Arun Shukla & team, in a seminal study, using Cryo-EM have identified a novel motif in GPCRs that is critical for interaction and activation of its key molecular partner, the beta-Arrestins. The study paves way for design of novel intervention strategies targeting GPCR signaling.

https://pubmed.ncbi.nlm.nih.gov/37209686/

Nanocarbon-Enforced Anisotropic MusCAMLR for Rapid Rescue of Mechanically Damaged Skeletal Muscles. Chatterjee N, Misra SK. ACS Applied Materials & Interfaces. 2023 May 31.

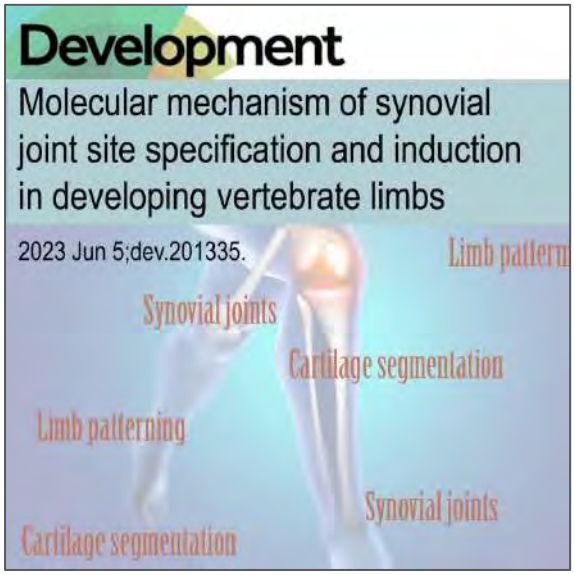


A study by **Prof. Santosh Misra's** team, spearheaded by Niranjan Chatterjee, displays the fabrication and use of advanced biomaterial systems as a non-drug therapeutic alternative for healing mechanically damaged muscles. The study shows how the passivated nanocarbon based biomaterial assists muscle regeneration, and could be of potential use in addressing other muscle disorders including muscular dystrophy.

https://pubmed.ncbi.nlm.nih.gov/37257065

Research Highlights

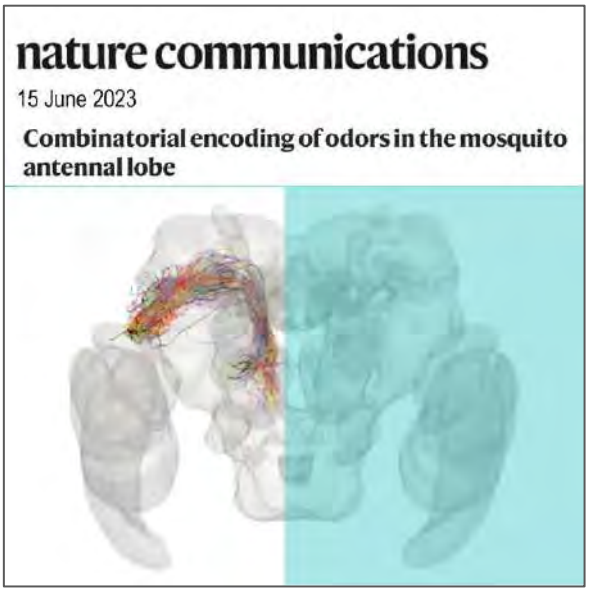
Molecular mechanism of synovial joint site specification and induction in developing vertebrate limbs Yadav US, Biswas T, Singh PN, Gupta P, Chakraborty S, Delgado I, Zafar H, Capellini TD, Torres M, Bandyopadhyay A.. Development. 2023 Jun 5:dev-201335.



An insightful study by **Prof. Amitabha Bandyopadhyay** and team offers critical understanding into formation of limb joints. The study elaborates how interplay between key signaling pathways triggers activation of essential molecules that mark future joint sites. The insights offered in the study could be explored to address congenital skeletal joint defects.

https://pubmed.ncbi.nlm.nih.gov/37272420/

Combinatorial encoding of odors in the mosquito antennal lobe. Singh P, Goyal S, Gupta S, Garg S, Tiwari A, Rajput V, Bates AS, Gupta AK, Gupta N. Nature Communications. 2023 Jun 15;14(1):3539.



Prof**. Nitin Gupta** and team in a pioneering study display how individual chemical odorants are perceived and processed by the neuronal circuitries in the mosquito brain. Their results provides a unifying foundation to understand the neural basis of olfaction.

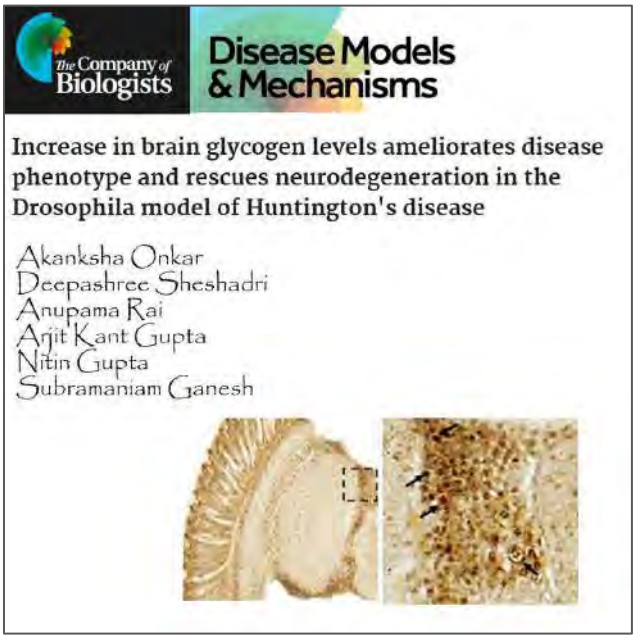
https://pubmed.ncbi.nlm.nih.gov/37322224/

Research Highlights

BMP signaling: A significant player and therapeutic target for osteoarthritis. Jaswal AP, Kumar B, Roelofs AJ, Iqbal SF, Singh AK, Riemen AH, Wang H, Ashraf S, Nanasaheb SV, Agnihotri N, De Bari C. Bandyopadhyay A. ***Osteoarthritis and Cartilage. 2023 Jun 29.***

Prof. Bandyopadhyay and team explore the role of BMP signalling in osteoarthritis (OA) etiology and offer a disease-modifying therapy for OA. The study shows that induction of OA coincides with depletion of negative regulator of BMP signalling and thereby a gain of BMP signalling. In mouse articular cartilage gain of BMP is sufficient to induce OA even without surgery. Further, genetic, or pharmacological BMP signalling suppression prevents pathogenesis of OA. Their study thus offers inhibiting BMP signalling locally as a potent strategy for alleviating OA.

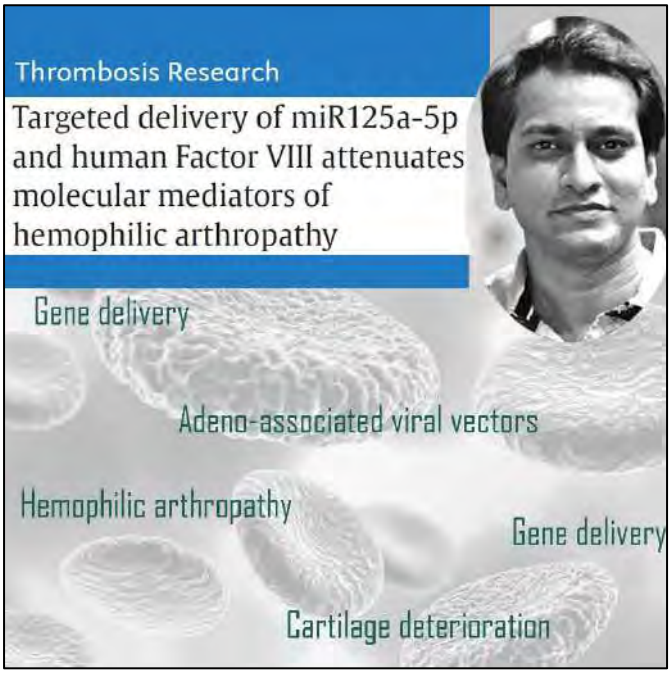
Increase in brain glycogen levels ameliorates disease phenotype and rescues neurodegeneration in the Drosophila model of Huntington's disease. Onkar A, Sheshadri D, Rai A, Gupta AK, Gupta N, Ganesh S. ***Disease Models & Mechanisms. 2023 Sep 8: DMM-050238.***



A study by **Prof. S. Ganesh** and team offers evidence for neuroprotective functions of glycogen synthase and glycogen in neurodegenerative disease, using the fruit fly Huntington model.

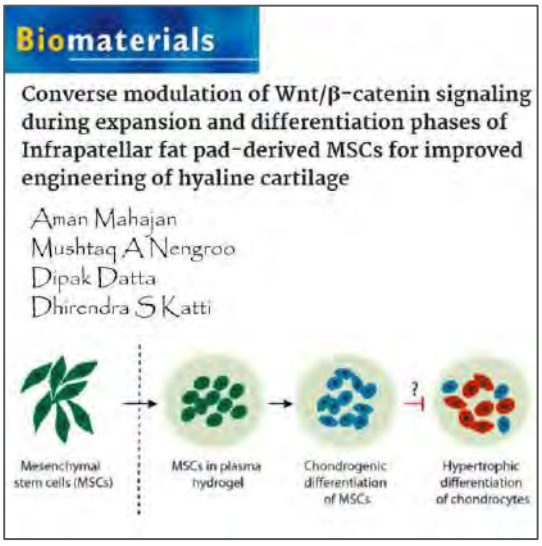
Research Highlights

Targeted delivery of miR125a-5p and human Factor VIII attenuates molecular mediators of hemophilic arthropathy. Senthilkumar MB, Sarangi P, Amit S, Senguttuvan S, Kumar N, Jayandharan GR. Thrombosis Research. 2023 Sep 17.



Hemophilic arthropathy (HA) due to repeated bleeding into the joint cavity is a major cause of morbidity in patients with hemophilia. The molecular mechanisms contributing to this condition are not well characterized. **Prof. Jayandharan Rao and team** looked into the role of microRNAs (miRs) which are known to modulate the phenotype of multiple joint diseases such as osteoarthritis (OA) and rheumatoid arthritis (RA). A targeted screen of miR125a-5p and its target genes in a murine model of chronic HA revealed significant downregulation of miR125a-5p. Using an Adeno-associated virus (AAV) vector delivery system, administration of miR125a-5p intra-articularly alleviated HA-linked morbidity such as decrease in inflammation and cartilage-degradation.

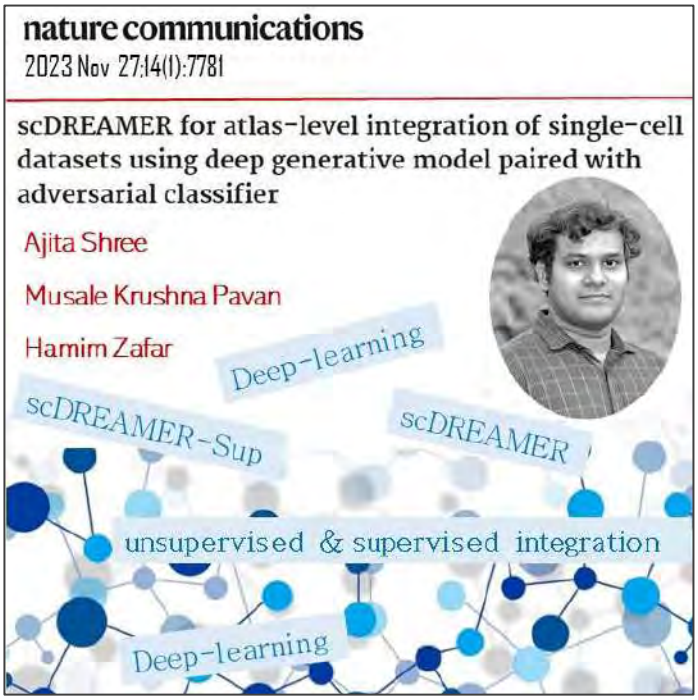
Converse modulation of Wnt/β-catenin signaling during expansion and differentiation phases of Infrapatellar fat pad-derived MSCs for improved engineering of hyaline cartilage. Mahajan A, Nengroo MA, Datta D, Katti DS. Biomaterials. 2023 Nov 1;302:122296.



A study by Prof. Dhirendra Katti and team offers technological advancement for clinical use of Mesenchymal stem cells (MSCs) to engineer hyaline cartilage. The study establishes method to overcome risk of ossification in the neo-tissue which is a major challenge to the clinical use of MSCs in cartilage repair.

Research Highlights

scDREAMER for atlas-level integration of single-cell datasets using deep generative model paired with adversarial classifier. Shree et al., Nature Communications. 2023 Nov 27;14(1):7781.

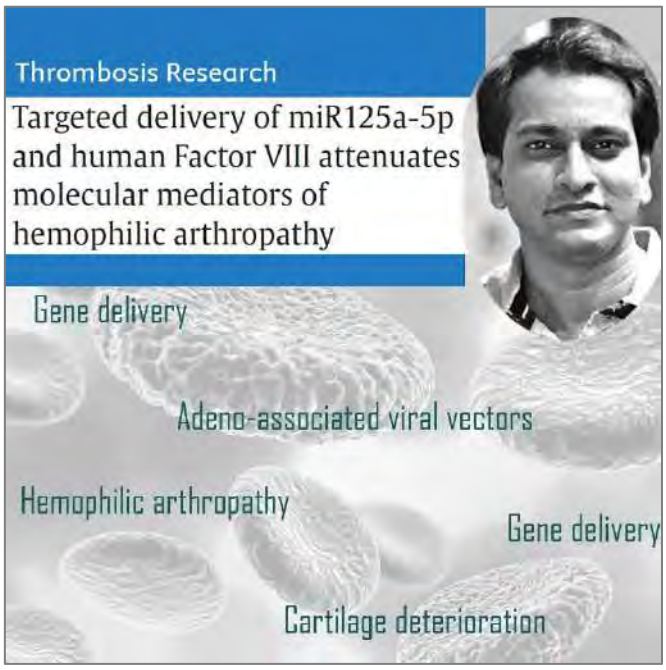


scDREAMER a data-integration framework developed by Dr. Hamim Zafar & team for integration of multiple single-cell sequencing datasets across tissues, times, conditions and species, to allow identification of underlying expression programs defining complex biological systems.

The platform so engineered

Research Highlights

Targeted delivery of miR125a-5p and human Factor VIII attenuates molecular mediators of hemophilic arthropathy. Senthilkumar et al., Thrombosis Research. 2023 Nov 1;231:8-16



Patients with hemophilia often suffer repeated bleeding into the joint cavities resulting in Hemophilic arthropathy (HA). Prof. Jayandharan Rao & his team have shown that administration of microRNA, miR125a-5p significantly decreases HA-associated inflammation and cartilage-degradation of joints. The study paves way for design of possible therapeutic intervention strategies.

Research Highlights

Strontium-Substituted Nanohydroxyapatite-Incorporated Poly (lactic acid) Composites for Orthopedic Applications: Bioactive, Machinable, and High-Strength Properties. Shaikh et al.. Biomacromolecules. 2023 Oct 24;24(11):4901-14.

Prof. Ashok Kumar and team demonstrate the fabrication of biodegradable composites that exhibit improved mechanical properties, formability, radiopacity with desirable biological behavior. The composites hold immense promise as machinable implant materials for orthopedic applications.

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GPCRs driving β-arrestin activation. Molecular Cell. 2023 Jun 15;83(12):2091-107.

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Mehta Family Centre for Engineering in Medicine Inauguration & Research Symposium

The inauguration of the Mehta Family Centre for Engineering in Medicine, IIT Kanpur was held on November 6th 2023, marked by a two-day inaugural research symposium.

The Inauguration was graced by presence of Shri Rahul Mehta and Smt Jyoti Mehta of the Mehta Family Foundation, Dr. Shankar Subramaniam, UCSD, Dr Gang Bao, Rice University, invited heads from other Mehta family Centers along with students and faculty of IIT Kanpur.

Dr. K. Radhakrishnan, chairman BoG, IIT Kanpur and Prof. S. Ganesh the officiating Director IIT Kanpur, presided over the inaugural. Dr. Abhay Karandikar, Secretary, Department of Science & Technology (and the former Director of IIT Kanpur) was the honourable chief guest for the occasion.

Dr. K. Radhakrishnan, chairman BoG, IIT Kanpur, ...

MFCEM is turning point in the history of the institute....

The inaugural session commenced with Prof. Dhirendra Katti, walking the audience through the journey of MFCEM through its inception at a Pan IIT meet upon a chance meeting with Shri Rahul Mehta in 2014 to the formalizing and establishing the MFCEM centre. The immense contribution of Prof. Shankar in steering the formation of the centre and the unparalleled role of the then director Prof. Abhay Karandikar in providing visionary leadership. Utilizing the existing strength in various domains of basic biology at the department of biological sciences and bioengineering and the expertise in diverse engineering disciples, three focus areas of research at MFCEM were formalized, namely: Digital medicine; Regenerative medicine and Molecular medicine.

Prof. Ahay Karandikar professed the commitment and passion of Shri Rahul Mehta towards establishing not only the Mehta centre of Engineering in Medicine at IIT Kanpur but also similar other centres across other IITs to address grand challenges in the field of medical science. He congratulated the department of BSBE for being a leading bioscience unit in the country with outstanding faculty that promote cutting edge research and innovation. He expressed his conviction that the MFCEM will take research to a global scale. Acumen to paradigm shift..

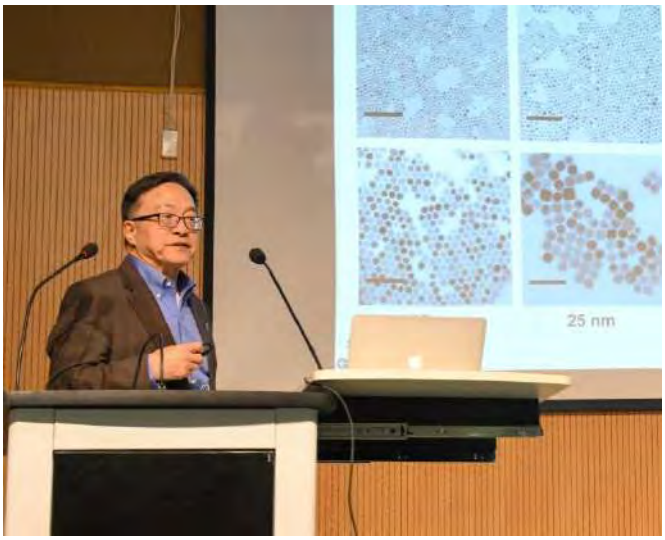
Prof Shankar Subramaniam, UCSD and Prof. Gang Bao, Rice university, hailed Shri Rahul Mehta for championing genuine transformative steps to address outstanding global challenges in medicine. Prof. Subramaniam highlighted the need to bringing engineering perspective to biological and medical sciences and expressed his hope and belief that the established MFCEM would be an enabling, transformative space that would foster interdisciplinary collaborative science and engineering.

The inauguration ended with Prof. S Ganesh officiating director IIT Kanpur affirming the futuristic vision of establishing a centre for engineering in medicine at IIT Kanpur which he believed would be a forerunner for other such units across the country, to cater to outstanding problems in health care sector. In closure Prof. Amitabha Bandhyopadhyay, head department of Biological Sciences and Bioengineering, expressed his heartfelt gratitude through a vote of thanks.

Inaugural & Research Symposium

The two-day research symposium was organized in three modules covering the three focus areas of MFCEM, namely Digital medicine, Molecular Medicine and Regenerative medicine. Keynote addresses by stalwarts in respective fields, invited talks, students presentations and poster sessions provided an exhilarating platform for vibrant interaction and discussion.

Session on molecular medicine was chaired by Prof. Ashwani Kumar Thakur, The session entailed a keynote address by Dr. Gang Bao, department chair & Foyt Family professor of Bioengineering and Professor of Chemistry and Materials Science & Nanoengineering. Rice University, who delivered a talk on "Nanomedicine and genome editing based approaches for disease therapies". Dr Bao is a pioneer in nanomedicine, molecular imaging, and the emerging area of genome editing. The keynote talk was followed by Aurobindo Nath Bose Entrepreneurship Lecture by Dr. R. Venkataramanan, founder and CEO of Karkinos Healthcare and an Advisor to the Chairman, Reliance Industries Limited. Dr. Venkataramanan talked on "Molecular medicine in Oncology practice". The session ended with short talks by students, wherein Tanay Biswas spoke on "Molecular landscape of genomic alterations in Indian prostate cancer patients." Simran Singh delivered a short talk on "Pancreatic islet single-cell transcriptomic and epigenomic atlas at different degrees of Insulin resistance in diet induced obesity murine mode" and Saptomee Chakraborty elaborated on "NFκB/p-JNK inhibition mediated regulation of cartilage homeostasis by a combination of doxycycline and IGF-1 synergistically attenuates osteoarthritis."



Prof. Gang Bao, Rice University, delivering the keynote address in the session on molecular medicine

Inaugural & Research Symposium

Day two of the research symposium had a Pre-noon session on **Digital medicine** and a post noon session on **Regenerative medicine**. The session on digital medicine was chaired by Prof. R. Sankararamakrishnan. The session witnessed exhilarating keynote talk by Prof. Shankar Subramaniam, UCSD, titled "How is the brain reprogrammed in Alzheimers disease? Clues from digital medicine". The next talk was by Prof. Priyanka Bagade, IIT Kanpur provided an insightful overview of use of digital medicine in healthcare through a talk "IoT for Healthcare". The session ended with short talks by PhD students who gave a peak into their ongoing research activities. Ajith Shree gave a talk on "scDREAMER for atlas-level integration of single-cell datasets using deep generative model paired with adversarial classifier". Aditi Laddha talked on "Sweet transporters and KDEL receptors: Evolutionary and functional studies of sequentially diverse membrane proteins with similar structure fold." Finally, Amal Jude Ashwin gave a talk on "One minute cognitive physiology signals predict treatment outcome in depression as early by two weeks".

Prof. Shankar Subramaniam, UCSD, delivering the keynote address in the session on digital medicine.

Prof. Priyanka Bagade IIT Kanpur delivering an invited talk in the session on digital medicine.

The final session of the MFCEM inaugural research symposium on **regenerative medicine** was chaired by Prof. Dhirendra Katti. The session entailed a keynote talk by Prof. Shamik Sen, IIT Bombay. Prof. Sen delivered an insightful talk on

“Understanding and engineering the stem cell niche: regulation by the physical microenvironment”. The keynote address was followed by an invited talk by Prof. Jayandharan Rao, IIT Kanpur who spoke at length on “Indigeneous Gene Therapy Technologies: from Bench to Bedside” where in elaborated on the many gene delivery techniques including the successful use of the AAV vectors. The session ended with talks by students who provided insights into their ongoing research. Aman Nikhit spoke on “Utilizing nanocement-based carrier for delivering bioactive molecules and antibiotics for preventing septic implant failures in osteoporotic hip fractures in rat. Rafat Ali gave an peak into his research via his talk on “H2S-releasing peptide frameworks: A multifaceted therapeutic approach to Alzheimer’s disease”. Finally, Preeti Sati spoke on “Membrane-free liver on a chip model for drug screening.

In conversation with Shri Rahul Mehta.....
.....with Ayush Goel & Sushmita Kundu

A free and frank conversation with Shri Rahul Mehta was organized as part of the two-day inaugural event. Mr. Mehta led the audience through his journey from early childhood in Bombay (now Mumbai) to his student days in the USA, followed by his entrepreneurial journey and finally his current occupation as a busy Philanthropist. The audience got a sense of a very determined young Rahul who chased his dreams of going to the USA to pursue higher education, despite multiple failed attempts procuring a visa but ultimately succeeding.

Mr. Rahul Mehta in a freewheeling conversation with students at IIT K

Mr. Mehta's self-assuredness even at a young impressionable age was evident when he opted out of studying chemical engineering for which he had gone to the USA and instead pursued computer science which fascinated him much more. Mr. Mehta narrated how he while still in grad school pitched one of his grad projects as an idea at the International Oracle Users Conference, which received much appreciation. Converting the idea into a product paved the way for his journey as an entrepreneur.

.....countries that do well in science also generate economic prosperity.....

There was no looking back after which, and through sheer hard work, single-minded dedication and loads of self-belief, he went on to set up four successful companies and a foundation. When asked why he went back to Standford as a student much later in life, Mr. Mehta candidly confessed his love for continued learning and how the stay at Stanford provided him a holistic understanding and fresh perspective to topical issues such as climate change, society, and global health.

Upon being asked what it takes to be a philanthropist, Mr. Mehta's prompt response was that everyone has the capacity to be a philanthropist if only one has the passion

to fuel it. He further added that one must introspect and identify one's own true passion which would be a continued source of motivation and strength. Mr. Mehta shared that switching to full-time philanthropic work from being an entrepreneur was a tough decision for him since it involved a change in his identity, so to speak.

When asked why after establishing four successful businesses, did he decided to invest in education and healthcare that too in India for his philanthropic works, Mr. Mehta espoused that countries that do well in science also generate economic prosperity. He believes that the next fifty years Health care is where all innovation will occur. He further added that through his philanthropy he hopes to provide ecosystem for technology development and innovation to develop healthcare solutions that are low cost and effective and affordable to the larger society.

Some cherished moments from MFCEM inauguration…

MFCEM Inauguration

MFCEM inauguration and ribbon cutting ceremony…

Inaugural & Research Symposium

At the inaugural site……..

Head, BSBE with invited guests …….

MFCEM faculty interacting with invited guests …….

Gala dinner……..

Gala dinner…….

Inaugural & Research Symposium

Felicitation of students for their achievements……

Student Volunteers.....

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