2021

@AKU-CRM

Aga Khan University
Centre For Regenerative Medicine
and Stem Cell Research

Project starts to develop new targeted therapies for blood cancer

A study to develop new targeted therapies for a common form of blood cancer in adults - Philadelphia chromosome-positive (Ph+) Leukaemia - commenced at CRM. This pre-clinical study aims to inhibit the growth of leukaemia cells and ultimately cure the disease by targeting it with a novel therapy that combines stem cells and a protein with healing properties.

This research, led by Dr Afsar Mian, is sponsored through a PKR 14.5 million grant by the Higher Education Commission of Pakistan's National Research Programme for Universities. Read more >>

Professor Lalani addresses the Asia Pacific Advanced Network Meeting

Professor El Nasir Lalani, the Founding Director of CRM, delivered a keynote speech at the 51st annual meeting of the Asia Pacific Advanced Network.

Discussing the potential application of stem cell research, Professor Lalani shared his concerns about the emerging trend of clinics offering unapproved, potentially dangerous and costly stem cell treatments.

Watch the keynote address >>

Researchers gauge the power of microscopes for revealing chromosome mysteries

CRM faculty Dr Mohammed Yusuf and his team, in collaboration with researchers in the UK, published a paper that evaluated how fluorescence lifetime imaging and super-resolution microscopy can provide nanoscale information about chromosomes and their structure.

The reviewers suggested that these imaging methods, together with different labelling strategies and integration with other modalities, could reveal the unsolved chromosome mysteries and support a more in-depth understanding of chromosomes, especially during disease development.

Read the article published in Chromosome Research>>

Professor Lalani honoured as endowed chair

Professor El-Nasir Lalani, the Founding Director of CRM, received the Khatija and Mohan Manji Dhrolia Endowed Chair in Stem Cell Biology and Regenerative Medicine. He was honoured in the presence of the Chairman AKU Board of Trustees and the senior leadership of the University during a virtual investiture ceremony.

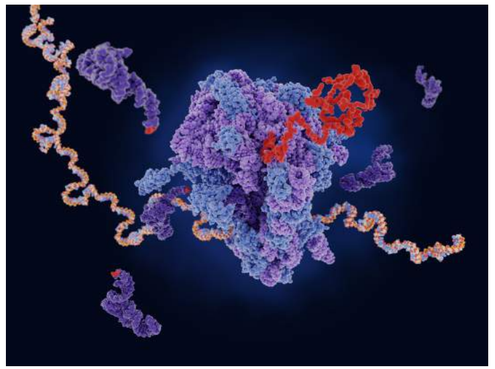
The award recognised the extraordinary contributions of Professor Lalani to his students, to the advancement of knowledge in regenerative medicine and stem cell science, and to the growth and development of research at AKU. Read more >>

Research reveals how a blood growth factor improves survival in breast cancer

CRM faculty Dr Nazia Riaz, a post-doctoral fellow with Torsten O Nielsen, and researchers from Shoukat Dedhar's group published a study which reported that high expression of a blood growth factor (Granulocyte Colony Stimulating Factor) is linked with significantly improved survival in an important group of breast cancer that does not respond to hormonal therapy.

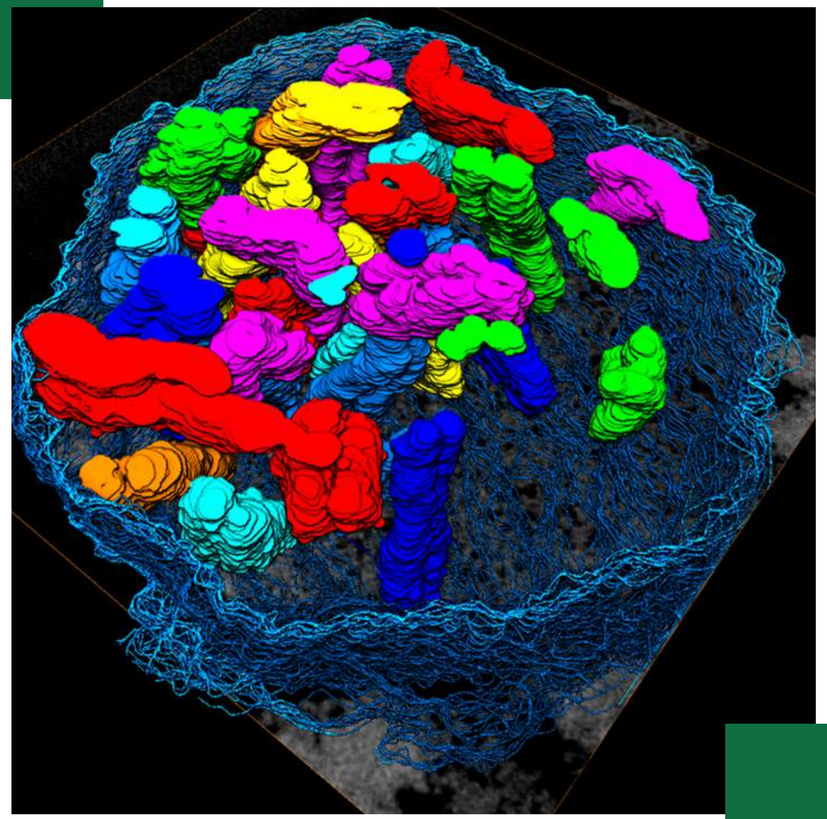
This favourable outcome was observed in the absence of hypoxia-induced carbonic anhydrase IX (CAIX), an enzyme that helps cancer cells to survive, grow and migrate. Read the research findings published in Cancers >>

Webinar on synthetic messenger RNA



Dr Tim Beissert
Senior Scientist and
Group Leader
TRON's Vector
Development and Gene
Transfer Service Unit of
Johannes Gutenberg
University Mainz,
Germany

CRM invited Dr Tim Beissert to conduct a webinar on the advancements in using ribonucleic acid (RNA) for developing health care solutions. He discussed the major areas of RNA application, particularly in protective immunisation against diseases.



CRM researchers develop a 3D map of chromosomes in a human prophase nucleus

“Findings from our study will contribute towards identifying repositioned chromosome patterns that will aid in developing clinical diagnostics and treatments for diseases such as cancer."

Professor El-Nasir Lalani,
Founding Director
AKU-CRM

Findings from a study that produced a 3D map of all 46 chromosomes in a human prophase nucleus were published in a special issue of the International Journal of Molecular Sciences.

The 3D map, which is accurate to the nanometre or billionth of a metre, will help researchers study changes in both the number and positioning of chromosomes during prophase that may result in the development of genetic illnesses and disorders.

CRM faculty Dr Mohammed Yusuf and his team collaborated with scientists from China, the US and the UK to conduct this study.

Read the full article >>

Invited talk: Looking ahead in Malaria

Dr Mehreen Datoo
Clinical Research Fellow and
DPhil Student
Oxford University

CRM invited Dr Mehreen Datoo to give a talk on the R21/Matrix M, an exciting new vaccine candidate for malaria. As the lead UK clinician working on the vaccine, she discussed the development and the potential of the vaccine and her work on evaluating its safety and efficacy.

CRM wins the World Bank-funded grand challenge award

The three-year US$ 1.02 M research grant will support the development of innovative gene-editing therapies for two significant blood disorders: Beta-thalassemia and Sickle Cell anaemia.

Dr Afsar Mian, the principal investigator of the study, is hopeful that these new therapies could be safe, less invasive, and more affordable than the existing therapies, such as blood transfusion and a bone marrow transplant. Read more >>

Dr Mohammed Yusuf shares his research at the International Chromosome Conference

Dr Mohammmed Yusuf was an invited speaker at the International Chromosome Conference and the International Colloquium on Animal Cytogenetics and Genomics. He presented his work on the 3D organisation of chromosomes in a human prophase nucleus.

July

Laboratory at CRM named after Dr Parveen Kanji

Take a tour of the lab >>

The AKU-CRM laboratory was named after the late Dr Parveen Kanji, a passionate and dedicated medical professional in the field of obstetrics and gynaecology. It was to honour Dr Kanji for her generous support since the founding of AKU and particularly for her donation towards expanding and enhancing CRM's existing and future infrastructure.

Dr Kanji's gift will continue to support cutting-edge research in regenerative medicine and stem cells, one of the most promising fields in health sciences and an area identified as a priority by the Chancellor, His Highness the Aga Khan. Read more >>

Gene knocked out to analyse how its absence causes neurodevelopmental disorders

“I am excited about getting one step closer to my overall project goal. This is part of a larger study to examine the emergence of human-specific neural cells, cortical features and molecular mechanisms that regulate embryonic development of the cortical brain.”

Dr Salma Jahan

For the first time at CRM, Dr Salma Jahan used CRISPR/Cas9 - a molecular gene-editing tool – to knock out an important gene from a healthy induced pluripotent stem cell (iPSC) line to develop a new iPSC line. Using the new cell line, she is aiming to analyse how the absence of this important gene causes problems in early brain development and results in neurodevelopmental disorders.

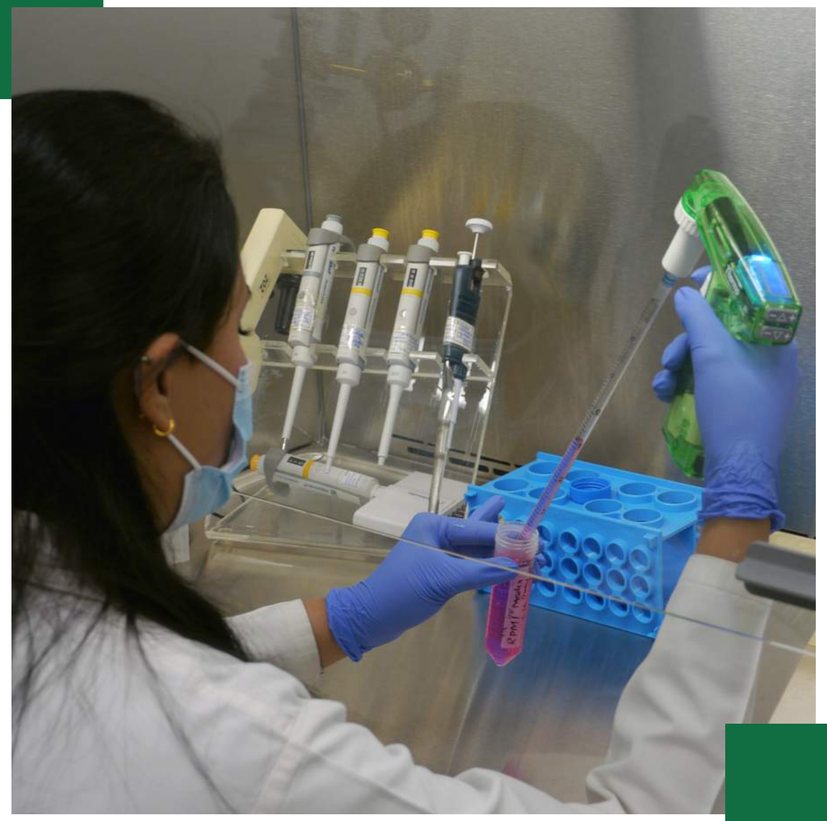
She is growing organoids from the iPSC cell lines with and without the gene to compare how its absence or presence impacts early brain development.

Existing research recognises the role of this important gene but does not provide a comprehensive understanding of how its absence affects early brain formation. Dr Jahan’s study aims to fill this gap.

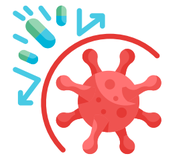
The findings of this study may help in developing effective treatments and identifying unknown genetic variants.

Dr Afsar Mian at the International Conference on Biotechnologies

CRM faculty Dr Afsar Mian gave an invited talk on the mechanisms of Ph+ Leukaemia and its molecular targeting at the International Conference on Biotechnologies for Environment, Health, and Agriculture, held in Islamabad.



CRM and Cardiff University researchers discover a previously unknown mechanism that causes drug resistance in blood cancer



This discovery will help researchers develop more effective and targeted treatments for Philadelphia-positive Acute Lymphoblastic Leukaemia.

Dr Afsar Mian and his team, in collaboration with researchers at Cardiff University, published a study that discovered a previously unknown series of cascading chemical reactions or a signalling pathway that causes drug resistance in Philadelphia-positive Acute Lymphoblastic Leukaemia.

The researchers confirmed that targeting or blocking this pathway can kill, or suppress the growth of drug-resistant Leukaemic cells and ultimately stop their spread. The study findings were published in the Neoplasia journal. Read more >>>

A study investigates the biology of RBC formation

Dr Hammad Hassan and his team completed a study that aimed to understand the biology of erythropoiesis - the formation of red blood cells (RBCs). They designed a novel approach using two different drugs to differentiate a leukaemic cell line towards RBC formation.

Findings from this study that are yet to be published, will provide biological insights into the RBC formation as well as evidence on the effectiveness of the drugs in developing RBCs. This research could be of great interest to scientists involved in exploring the intriguing process of RBC formation.

Watch a video of the 3D-bio printer.

Novel bioinks for 3D-printing of artificial tissues

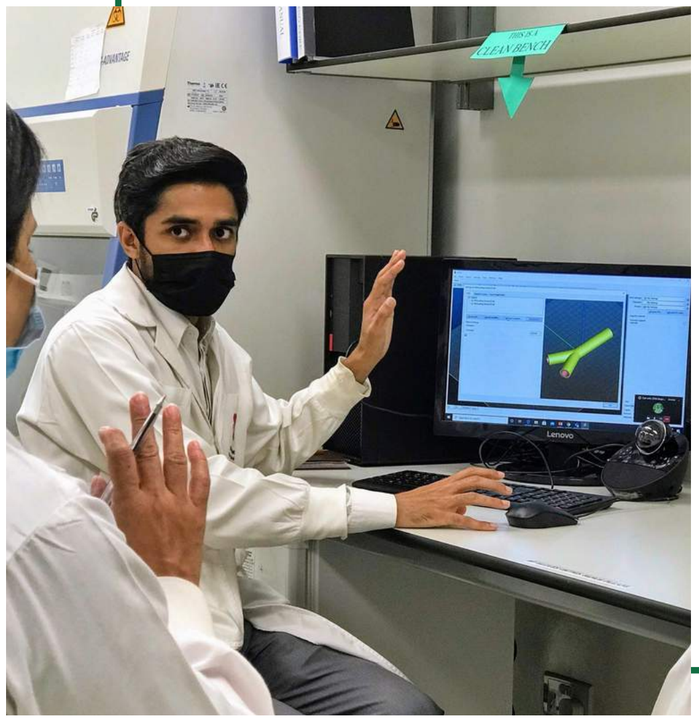
Our regenerative medicine team continued its work on developing novel bioinks from naturally derived biomaterials and synthetic polymers. These bioinks are important to support organised cell growth and to print 3D tissue structures. They function as support structures or envelopes to grow artificial tissues in the lab.

Identification of new bioink material will enable the tissue regeneration team to accelerate its research using a 3D-bioprinting facility that is already set up at CRM.

Capacity building of researchers

On-the-job training is integral to keeping our researchers at CRM up to date with emerging research techniques and developments. This year, our young researchers made journal club presentations on a variety of advancements in stem cell research and regenerative medicine, and also attended in-house training sessions on:

- Synthesis and fabrication of hydrogels from chemically modified biological molecules, and
- Cell culture techniques



As an early career scientist, CRM has put a lot of trust in my abilities, allowed me to be independent and supported me throughout when I got the opportunity to work with the director and other colleagues to develop a tissue engineering core facility. My training has been as an engineer but it was here at CRM that I learnt to think like a scientist while working with brilliant biologists.”

Syed Mustafa Jamal
Research Associate, Fullbright Scholar

New additions to the CRM team

CRM welcomed a team of young researchers with diverse academic expertise and a shared passion for stem cell research. It is encouraging to see young Pakistanis venture into this promising field. Way to go!

Dr Sheerien Rajput
Assistant Professor

PhD (Pathology and Laboratory Medicine), Aga Khan University, Pakistan

Dr Fawad Ur Rahman
Post-doctoral Fellow

PhD (Biomedical Engineering), Southeast University, China

Dr Muhammad Jameel
Post-doctoral Fellow

PhD (Biotechnology), National Institute for Biotechnology and Genetic Engineering, Pakistan

Fizza Iftikhar
Post-doctoral Fellow

PhD (Molecular Medicine), University of Karachi, Pakistan

New additions to the CRM team

Dr Irfan Hussain
Post-doctoral Fellow

PhD (Bioinformatics), National Center for Bioinformatics Quaid-i-Azam University, Pakistan

Shahid Hussain
Research Associate

MS (Biotechnology), International Islamic University Islamabad, Pakistan

Zahra Sajid
Research Associate

MS (Healthcare Biotechnology), National University of Sciences and Technology, Pakistan

Muhammad Zohaib
Research Associate

MPhil (Molecular Biology), National Centre for Excellence in Molecular Biology, University of The Punjab, Pakistan

Sujjawal Ahmad
Research Associate

MSc (Molecular Biology/Biochemistry), Quaid-i-Azam University, Pakistan

آغا خان یونیورسٹی

THE AGA KHAN UNIVERSITY

Established in 2016, the Centre for Regenerative Medicine and Stem Cell Research at AKU aims to design novel therapies for major diseases by developing a deeper understanding of disease processes through functional basic science research. We have a small, passionate team of researchers working with our international collaborators at the University of Calfornia, San Francisco and other universities on exciting research programmes. Most of these programmes are in their exploratory phase. For more information, visit our website.

Visit our website:
www.aku.edu/crm

Join us on
LinkedIn

Write to us at
crm.query@aku.edu