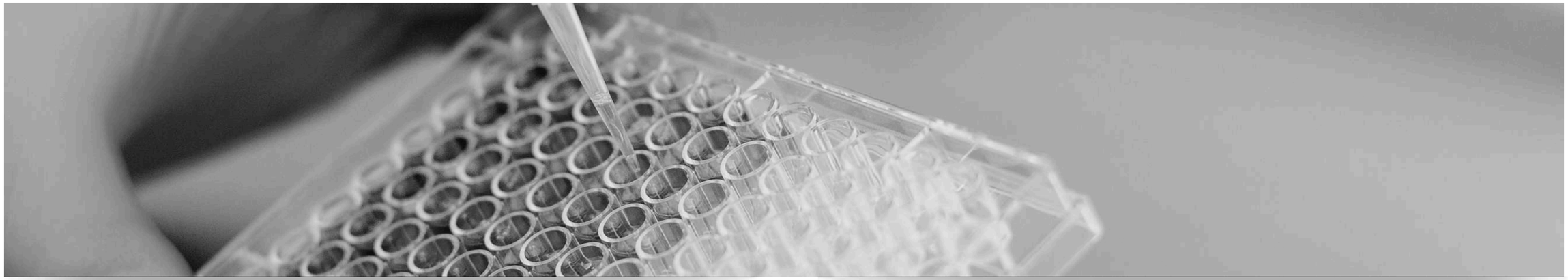
ANNUAL REPORT 2025

January - December 2025

THE AGA KHAN UNIVERSITY
CENTRE FOR REGENERATIVE MEDICINE AND STEM CELL RESEARCH



KEY HIGHLIGHTS

30+
competitive proposals submitted

09
major intramural and extramural grants secured

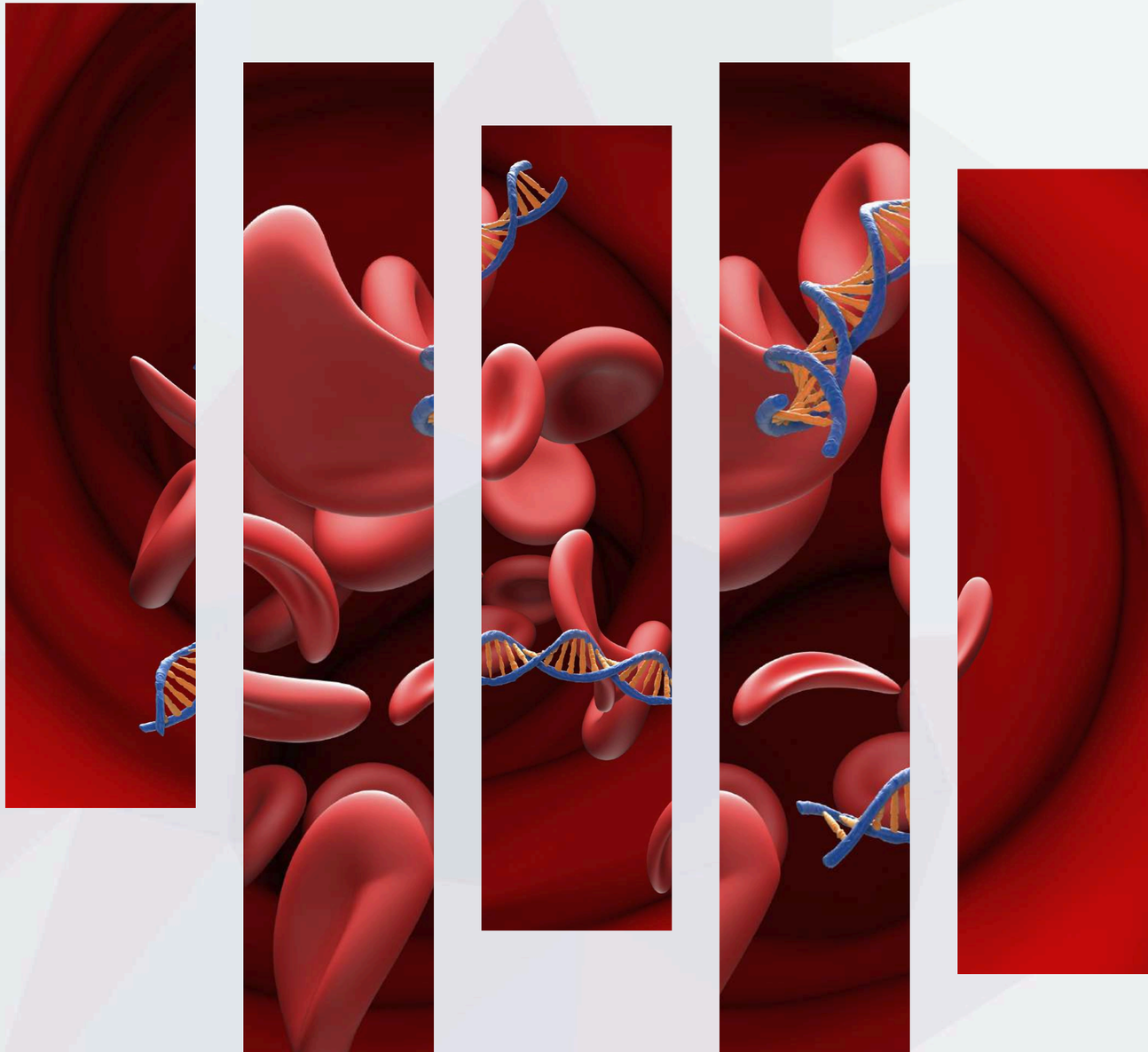
28
publications in peer-reviewed journals

06
abstracts shared in scientific forums

Publications

28
peer-reviewed publications in national and international journals

87.2
cummulative impact factor



Review paper

REKINDLING VISION

Retinal degeneration refers to a group of eye diseases that damage the cells responsible for vision and can ultimately lead to blindness. In a review article published in the International Journal of Molecular Sciences, Dr. Irfan Khan, together with colleagues from the Department of Ophthalmology and the University of Karachi, explains that some retinal diseases are inherited, such as retinitis pigmentosa, while others develop later in life, including age-related macular degeneration and diabetic retinopathy.

Current treatments mainly focus on slowing disease progression or managing symptoms rather than addressing the underlying causes. Emerging research in regenerative medicine, however, is exploring innovative strategies to repair or replace damaged retinal cells using stem cells, gene therapy, and other advanced technologies. Read more >>

Review paper

IRON OXIDE NANOPARTICLES

Cell sorting is a fundamental technique in stem cell research, regenerative medicine, and cell engineering, enabling scientists to isolate specific cell populations for study or therapy.

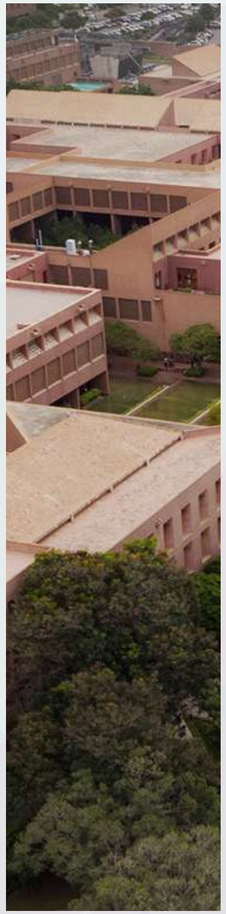
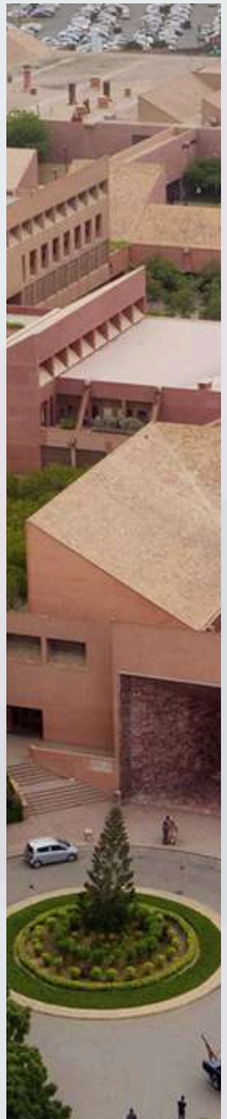
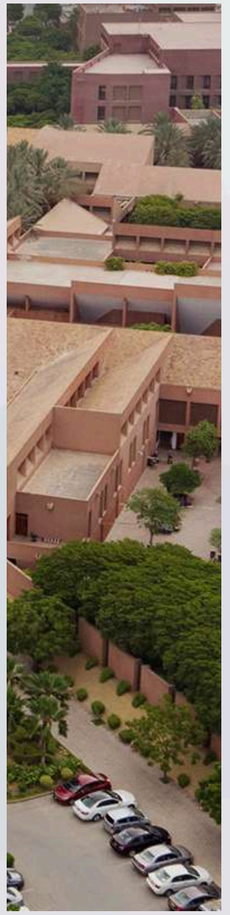
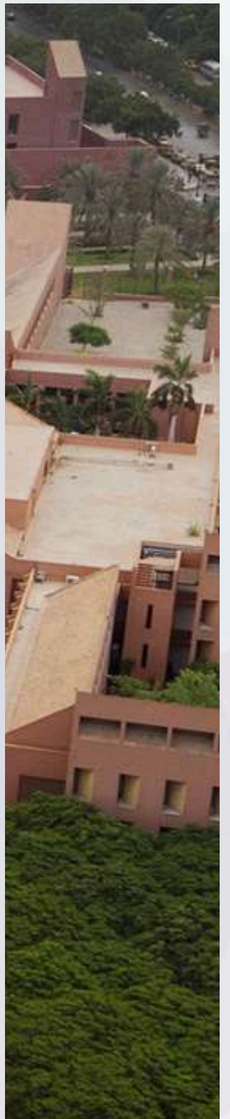
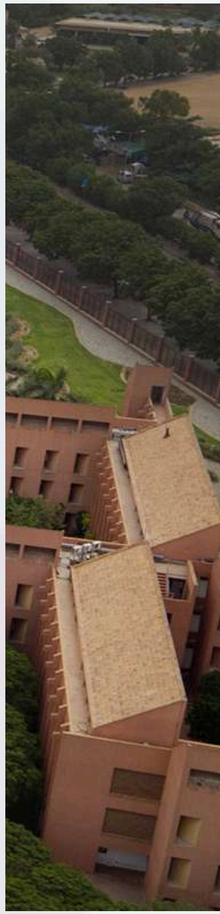
In a review published in BioNanoScience, CRM researchers led by Dr. Faward Ur Rehman discuss commonly used sorting methods, including density gradient centrifugation, flow cytometry-assisted cell sorting (FACS), and magnetic-activated cell sorting (MACS). The paper highlights the growing role of paramagnetic iron oxide nanoparticles (IONPs), which are valued for their strong magnetic properties, biocompatibility, and potential biomedical applications in cell sorting and regenerative medicine. Read more >>

Review paper

NEURO-DEVELOPMENTAL DISORDERS

Neuron navigators (NAVs) are cytoskeleton-associated proteins known for their important roles in axonal guidance, neuronal migration, and neurite growth during brain development. In a study published in Human Genetics, Dr. Ambrin Fatima, together with national and international collaborators, identified changes in the NAV3 gene as a cause of a rare neurodevelopmental disorder. By studying five patients from three families, the researchers discovered genetic variants that disrupt NAV3 function. These alterations were associated with developmental delays, learning difficulties, distinctive facial features, and behavioral challenges. The findings broaden understanding of the genetic basis of neurodevelopmental disorders. Read more >>

INTERNATIONAL ENGAGEMENTS

COLLABORATIONS

Dr. Ather Enam & Dr. Azhar Hussain

visited the University of California, San Francisco (UCSF) to rekindle partnerships and engagements.

Academics Across Borders

A new international collaboration through Academics Without Borders was established with the University of Victoria to advance 3D bioprinting and glioblastoma modeling capacity.

Internal Collaborations

Collaborations with AKU clinical experts are underway to explore stem cell and regenerative medicine-based approaches in the areas of orthopedics and dental surgery.

Dr. Irfan Khan

Dr. Irfan Khan visited Johns Hopkins and UCSF to explore stem-cell-based therapeutic products under Good Laboratory Practices (GLP), aiming to accelerate treatments for degenerative eye conditions.

Dr. Fawad ur Rehman & Dr. Rida-e-Maria Qazi

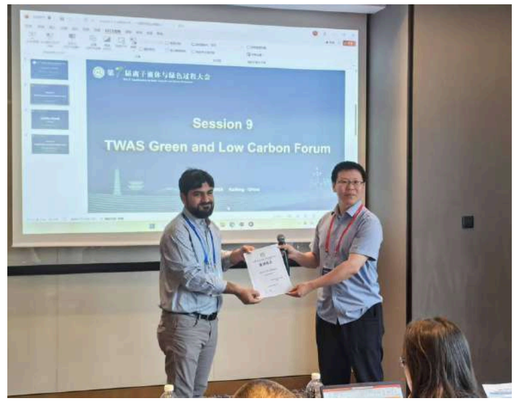
visited University of Henan, China for animal model studies as part of the Wellcome Leap–funded gene editing project.

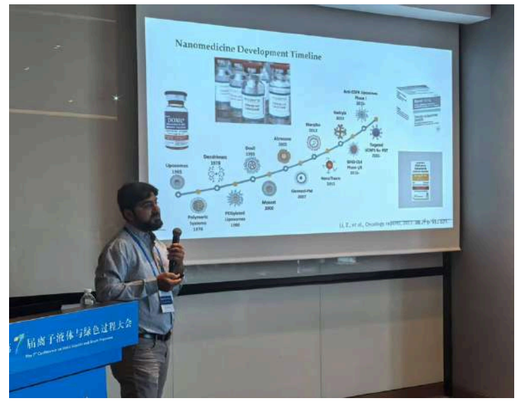
Ms. Safana Farooq

PhD scholar conducted research at TRON, University of Mainz, Germany on advanced gene editing therapies for beta thalassemia and sickle cell anemia.

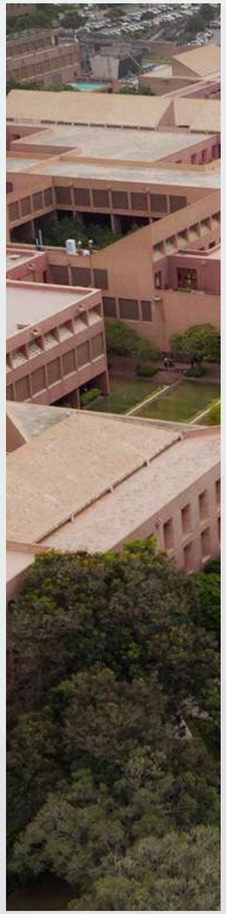
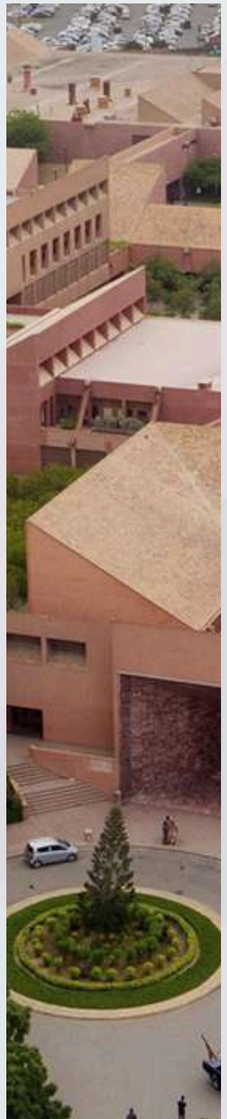
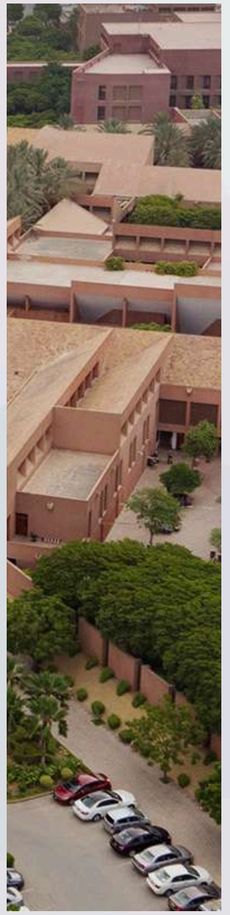
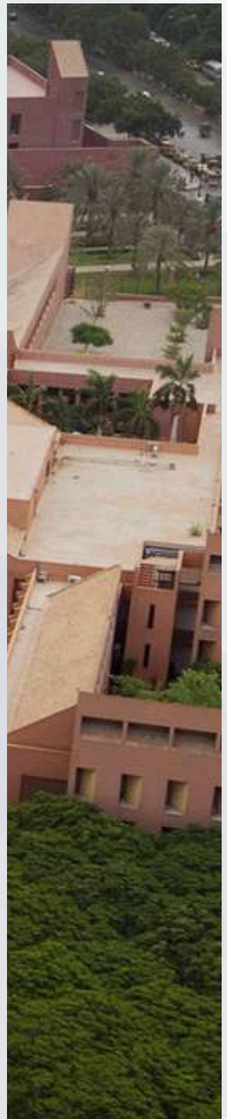
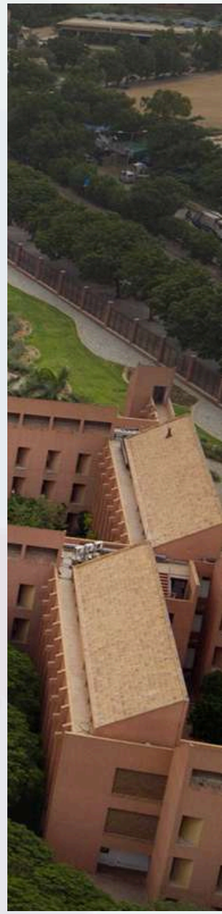
ADVANCING
GENE EDITING RESEARCH

As part of a Wellcome Leap–funded project on gene-editing therapies for thalassemia and sickle cell anemia, CRM researchers Dr. Fawad ur Rehman and Dr. Rida-e-Maria Qazi visited the University of Henan, China. From March 17 to June 17, they collaborated with Professor Zheng, conducting advanced preclinical research using animal models at the university's state-of-the-art facilities.





KNOWLEDGE DISSEMINATION

Research showcase

International Presentations

National Forums

Expert Panel Engagements

01

Our faculty presented their research on stem cells, hematology, gene/cell therapies, nanomedicine, and exosomes at prestigious international forums, including:

- International Society for Stem Cell Research (ISSCR)
- First Conference of the Turkish Society for Extracellular Vesicles
- Expert talks in Dubai, Italy, and Spain

02

Faculty delivered keynote speeches and research talks at prominent national institutions and conferences, such as:

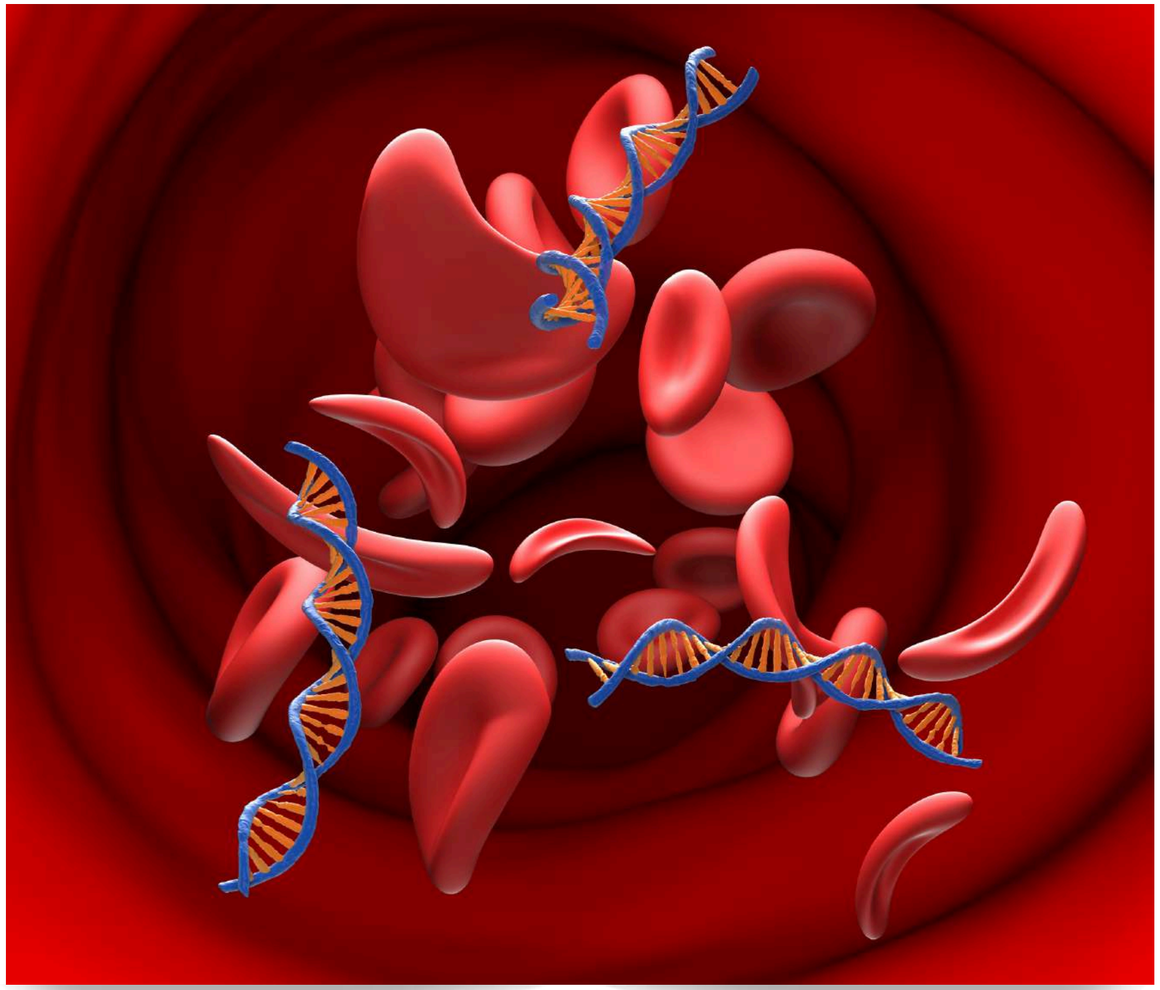
- Pakistan Society of Hematology
- COMSATS University
- University of Islamabad
- Forman Christian College University

03

Faculty participated in panel discussions and expert sessions, including:

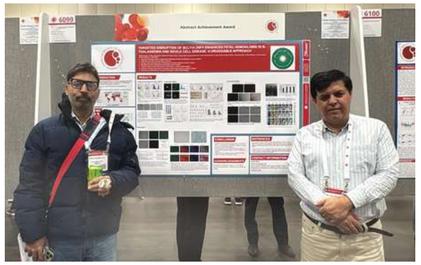
- International Conference on the Future of Healthcare 2025, Islamabad

Poster Presentation



INNOVATIVE GENE-EDITING STRATEGY

FOR HEMOGLOBINOPATHIES



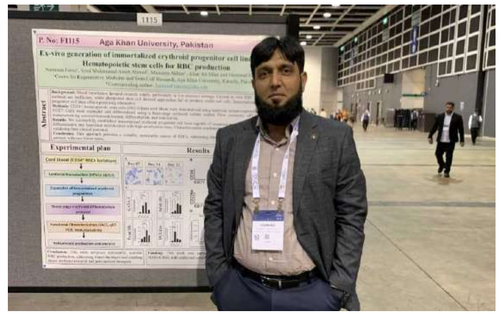
Dr. Afsar Mian presented a poster at the American Society of Hematology annual meeting, published in Blood, highlighting a novel gene-editing strategy for β-thalassemia and sickle cell disease.

The study demonstrated that targeted disruption of the BCL11A ZnF4 domain using CRISPR-Cas9 significantly enhances fetal hemoglobin (HbF) expression in patient-derived stem cells.

Poster Presentation

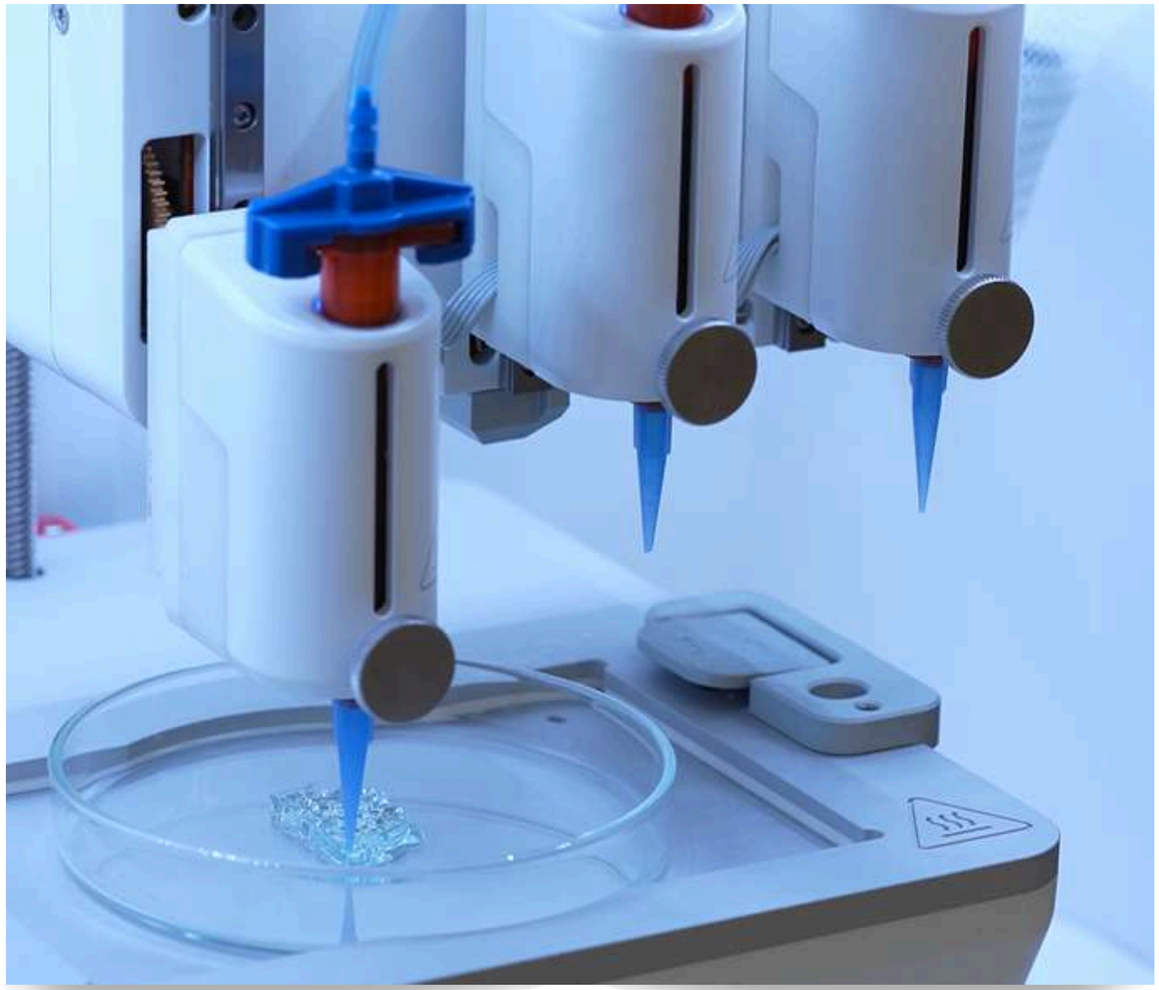
BLOOD

IN A DISH



Dr. Hammad Hassan presented his research at the annual meeting of the International Society for Stem Cell Research (ISSCR), held in June in Hong Kong.

His presentation, titled “Ex vivo Generation of Immortalized Erythroid Progenitor Cell Lines from Hematopoietic Stem Cells for Red Blood Cell Production,” highlighted advances in developing scalable cellular platforms for red blood cell production. The work contributes to ongoing efforts in translational stem cell research and innovative therapeutic applications.



Poster Presentation

3D BIO-PRINTED SPHEROIDS

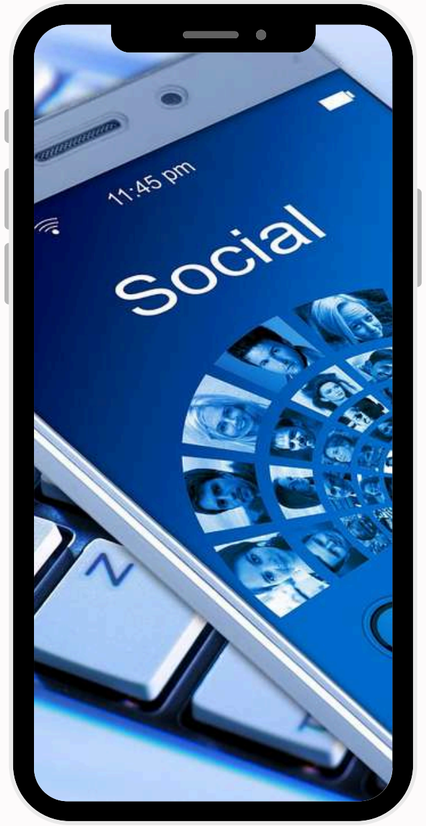
IN GLIOBLASTOMA RESEARCH

Professor Syed Ather Enam and his research group presented their study titled “Development and Validation of Standardized Confrontational Assay Using 3D Bio-printed Spheroids in Glioblastoma Research” at two major scientific forums: the Congress of Neurological Surgeons Annual Meeting 2025, held in October in Los Angeles, California, and the 38th Annual Conference of the Pakistan Society of Neurosurgeons, conducted at PC Hotel, Malam Jabba, Swat, in November.

Professor Enam and his team are working on the development and validation of a standardized confrontational assay using 3D bioprinted spheroid models for glioblastoma research to study tumor invasion and cell–cell interactions.

Public Engagement

Our LinkedIn page has surpassed 11,000 subscribers, reflecting the growing public interest in regenerative medicine and stem cell research and highlighting our continued commitment to science communication, public engagement, and knowledge dissemination.

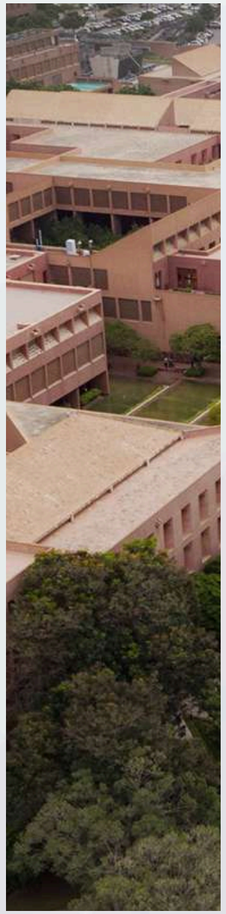
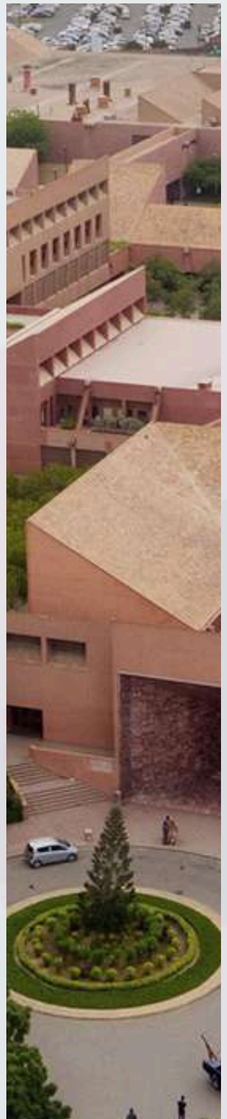
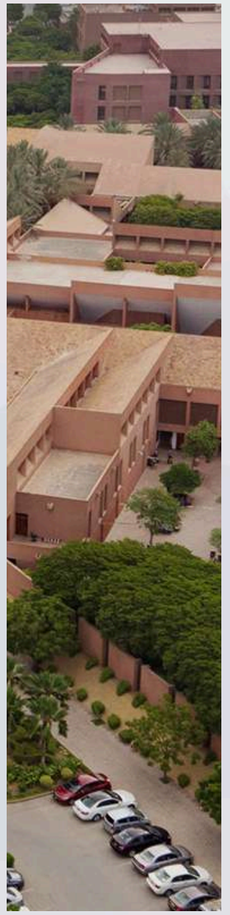
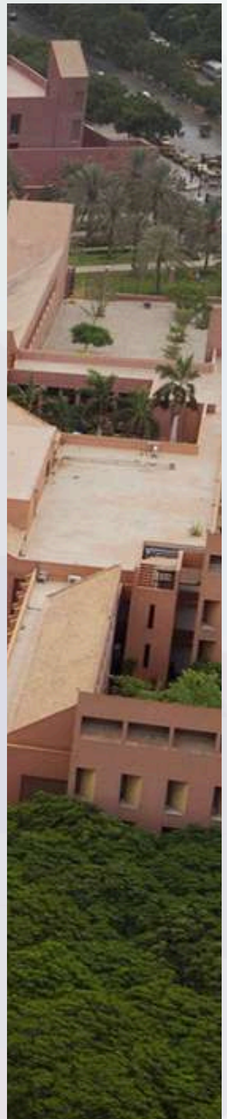
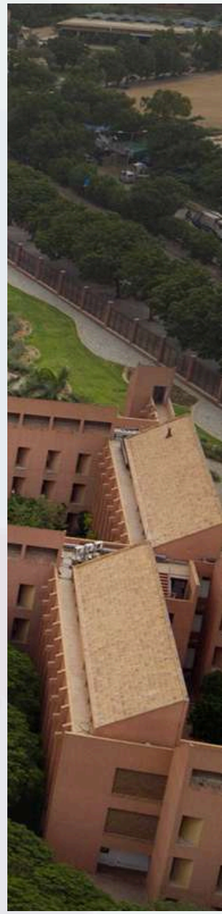


11K
Subscriptions on LinkedIn Page

132K
Impressions on LinkedIn in past 365 days

23K
Views on Website in past 365 days

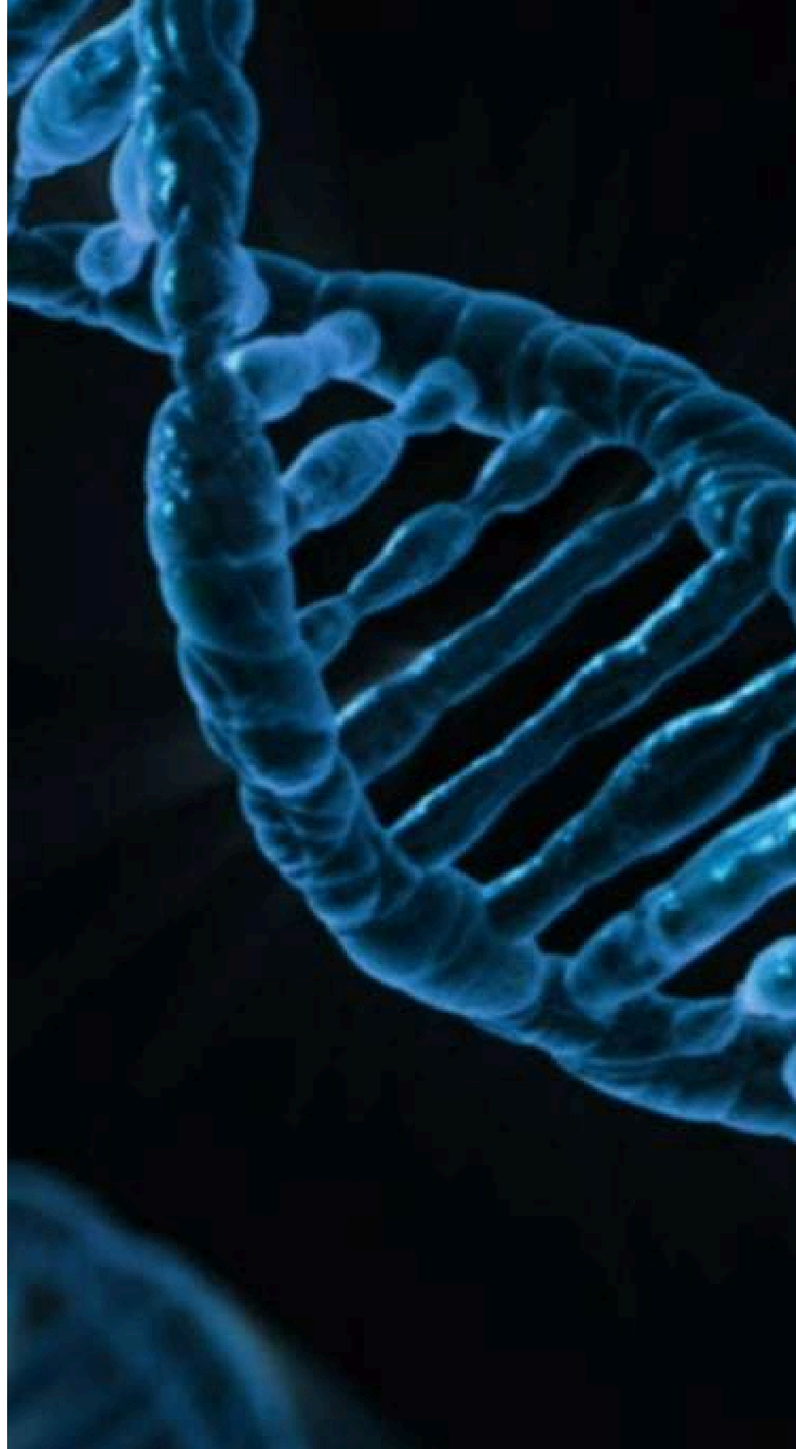
CAPACITY BUILDING

A workshop participant receiving hands-on training on molecular biology techniques

STEM CELLS: BASICS & BEYOND

A two-day workshop held in May introduced 25 participants from across Pakistan to the fundamentals of stem cell biology, including classifications, applications, and hands-on training in core laboratory techniques such as immunostaining, cell culture, and characterization. The program also fostered critical discussions on the translational and clinical implications of stem cell research.



Tooba Tajammul,
Workshop
Participant

Participant's Reflections

For me, the workshop was an excellent learning opportunity. All talks were comprehensive, and the speakers elaborated on the concepts, followed by hands-on exposure to the foundational techniques. It especially added to my existing skills and helped me immensely in my academic pursuits during my MPhil research work.

Inspiring Future Generations

32

Interns, trainees, and students received hands-on training at CRM

We had the privilege of hosting two MPhil students, Ms. Zameera Wahid and Ms. Shali Anwar, from the University of Turbat, as part of their thesis research placement. Both students, hailing from the Makran division in Balochistan, were motivated by the high burden of genetic disorders such as thalassemia in their communities and sought to strengthen their research capacity through hands-on laboratory experience.

During their placement, they worked under the mentorship of Dr. Afsar A. Mian's team, actively engaging with researchers and utilizing CRM's advanced laboratory facilities to conduct experimental work aligned with their thesis objectives.

Dr. Rida-e-Maria Qazi demonstrating lab-experiments to trainees

Areeba Lalani,
BSc Biological Sciences student, Imperial College London

Internee Reflection

My time at AKU-CRM has been a rewarding experience...I had the opportunity to work on a project aimed at correcting the sickle cell disease mutation using cutting-edge gene editing technologies. This project gave me invaluable hands-on exposure. What made it truly special was the trust I was given, to be hands-on in the lab, learn from the mistakes and grow from them.

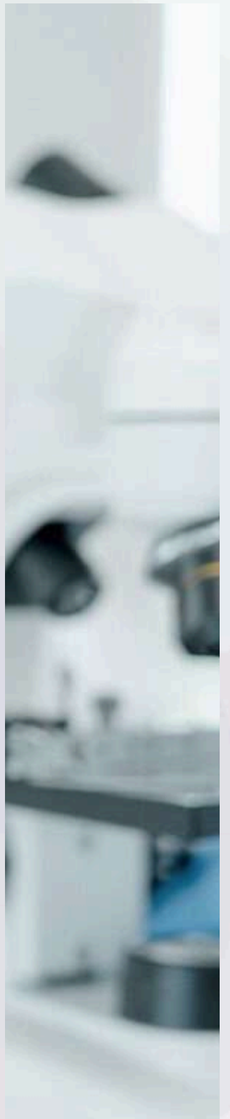
KEY INITIATIVES

Research Retreat (Feb 2025) – CRM had its first mini research retreat on February 1st, which offered a distinctive opportunity for faculty members to engage in meaningful discussions, exchange innovative ideas, and share their research findings. The event was successfully executed.

In May, the CRM Juma Research Lab Advisory Committee (CJAC) was formed to bring together a multidisciplinary team of senior faculty members from AKU MC to advise on ethical, scientific, and regulatory aspects to enhance stem cell research quality and impact.

1st Regenerative Medicine and Stem Cell Conference (RSC-2026):
CRM formally commenced the planning phase for its inaugural conference in Pakistan. This milestone marks a significant step in advancing national dialogue and collaboration in the field.

Success Highlights



Success Stories

DR AFSAR MIAN

SELECTED FOR NATIONAL LEADERSHIP ROLES

Dr. Afsar Mian was selected as a member of the URAAN Program under the Ministry of Planning, Development & Special Initiatives, Government of Pakistan. His selection reflects national recognition of his expertise and contributions to research, innovation, and strategic scientific development.

In addition, Dr. Mian was appointed as a member of the expert panel at the Higher Education Commission (HEC), Pakistan. In this capacity, he contributes to academic evaluation, research standards, and higher education policy development at the national level.

These appointments underscore Dr. Mian’s growing role in shaping science, research governance, and higher education strategy in Pakistan, and highlight the broader institutional commitment in contributing to the national scientific leadership.

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AWARDS AND RECOGNITIONS

Prof. Syed Ather Enam, *SI*

University Award of Distinction

Sujjawal Ahmad

Award of Distinction (Master of Health Policy & Management)

Sadia Habib

Team Award for Innovation in Education

Areeb Ahmed

Team Award for Innovation in Education

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 California, San Francisco and other universities on exciting research programs. Most of these programmes are in their exploratory phase. For more information, visit our website.

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