

DR. MARIA TAYYAB BAIG, Ph.D.

Assistant Professor | Molecular Biologist | Stem Cell & Regenerative Medicine Researcher

Centre of Excellence in Molecular Biology (CEMB), University of the Punjab, Lahore, Pakistan

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Google Scholar: <https://scholar.google.com/citations?user=kYnXf4kAAAAJ&hl=en> | ResearchGate: <https://www.researchgate.net/profile/Maria-Baig>

RESEARCH PROFILE

Molecular biologist and stem cell researcher with 17+ years of research experience in mesenchymal stem cell biology, regenerative medicine, liver fibrosis, molecular genetics, and translational cell therapy. Assistant Professor at CEMB, University of the Punjab, with expertise spanning stem cell-based and cell-free regenerative therapeutics, including cellular preconditioning, exosome biology, extracellular vesicle-mediated paracrine mechanisms, and tissue repair. Experienced in multidisciplinary in vitro and in vivo research involving stem cell culture, liver injury and fibrosis models, stem cell transplantation, molecular and proteomic analyses, and histopathology, with publications spanning stem cell therapy, liver regeneration, oxidative stress, exosomes, and emerging cell-free therapeutic approaches.

RESEARCH INTERESTS

Mesenchymal stem cell biology • Regenerative medicine • Stem cell-based and cell-free therapeutics • Exosomes & extracellular vesicles • Paracrine signalling • Liver regeneration & fibrosis • Cellular preconditioning • Oxidative stress • Translational cell therapy • Molecular disease modelling

POSTDOCTORAL RESEARCH FOCUS

Interested in postdoctoral opportunities at the interface of stem cell biology, regenerative medicine, extracellular vesicles, cell-free therapeutics, and translational biomedical research. Particularly interested in multidisciplinary research environments investigating mechanisms of tissue regeneration, therapeutic paracrine signalling, stem cell potency, extracellular vesicle biology, and innovative approaches for developing clinically relevant regenerative therapies.

ACADEMIC QUALIFICATIONS

Ph.D. in Molecular Biology 2015–2022

University of the Punjab, Lahore | CGPA: 3.86/4.00

Thesis: Antioxidant Preconditioning of Mesenchymal Stem Cells for Treatment of Damaged Liver

M.Phil. in Molecular Biology 2013–2015

University of the Punjab, Lahore | CGPA: 4.00/4.00

Thesis: Preconditioning of Adipose-Derived Stem Cells with Serum from Acute Liver Injury Model Enhances Their Therapeutic Potential for Liver Fibrosis

B.Sc. (Hons.) in Microbiology and Molecular Genetics 2003–2007

University of the Punjab, Lahore | CGPA: 3.72/4.00

Thesis: Informativeness of Intron 13 CA repeats in Carrier Detection of Haemophilia A

PROFESSIONAL APPOINTMENTS

Assistant Professor 2023–Present

Centre of Excellence in Molecular Biology (CEMB), University of the Punjab

- Conduct and supervise research in stem cell biology, regenerative medicine, molecular biology, and emerging cell-free therapeutics.
- Supervise postgraduate research in stem cell biology, liver regeneration, fibrosis, cellular preconditioning, and related therapeutic approaches.
- Lead experimental studies integrating cellular, molecular, animal, and histopathological approaches; contribute to teaching, mentoring, scientific writing, and research dissemination.

Research Officer cum Lecturer 2008–2023

Centre of Excellence in Molecular Biology (CEMB), University of the Punjab

- Conducted research in mesenchymal stem cell biology and regenerative medicine, with emphasis on liver injury, fibrosis, experimental design, disease modelling, stem cell transplantation, and molecular analysis.
- Contributed to postgraduate teaching, student training, and academic research activities.

RESEARCH EXPERIENCE

Mesenchymal Stem Cell Biology & Regenerative Medicine 2008–Present

Research focused on mesenchymal stem cell-based strategies for tissue repair and liver regeneration, with particular emphasis on cellular preconditioning, therapeutic efficacy, paracrine mechanisms, and emerging cell-free approaches.

Doctoral Research: Antioxidant Preconditioning of Mesenchymal Stem Cells for Treatment of Damaged Liver

M.Phil. Research: Preconditioning of Adipose-Derived Stem Cells with Serum from Acute Liver Injury Model Enhances Their Therapeutic Potential for Liver Fibrosis

Molecular Genetics & Human Disease Research 2006–2007

The Children's Hospital & Institute of Child Health, Lahore

Carrier Detection of Haemophilia A: patient sample collection, pedigree analysis, genomic DNA extraction, PCR-based molecular analysis, and carrier detection.

TECHNICAL & RESEARCH EXPERTISE

Stem Cell & Cell Biology: Mesenchymal stem cell isolation and culture • maintenance and expansion • cellular preconditioning • immunostaining • flow cytometry (FACS) • microscopy

Molecular & Cellular Biology: DNA/RNA/protein extraction • PCR • RT-PCR • gene expression analysis • agarose and polyacrylamide gel electrophoresis

Exosome & Cell-Free Therapeutics: Exosome biology • extracellular vesicles • cell-free regenerative therapeutics • stem cell paracrine mechanisms • extracellular vesicle-mediated communication

Preclinical Research: Experimental liver fibrosis models • in vitro hepatocyte injury • stem cell transplantation • tissue processing • histopathological analysis

Analytical & Digital: Spectrophotometry • Nanodrop • TLC • GraphPad Prism • statistical analysis • MS Word • PowerPoint • Excel

Professional: Scientific writing • experimental design • data interpretation • graduate student mentoring

SELECTED PEER-REVIEWED PUBLICATIONS

1. Raza MH, Ilyas J, Shahid K, Urooj Z, **Baig MT**, Shahid M. Molecular mechanisms governing exosome biogenesis, engineering strategies, and emerging role as cell-free therapeutics. *Molecular Biology Reports*. 2026;53(1):866.
2. Andleeb A, Butt H, Ramzan A, Ghufraan H, Masaud A, Rahman F, Tasneem S, **Baig MT**, Abbasi BH, Mehmood A. *Prunella vulgaris* and *Tussilago farfara* demonstrate anti-inflammatory activity in rabbits and protect human adipose stem cells against thermal stress in vitro. *Journal of Ethnopharmacology*. 2024;118985.
3. Ghufraan H, Azam M, Mehmood A, Umair M, **Baig MT**, Tasneem S, Butt H, Riazuddin S. Adipose Tissue and Umbilical Cord Tissue: Potential Sources of Mesenchymal Stem Cells for Liver Fibrosis Treatment. *Journal of Clinical and Experimental Hepatology*. 2024;14(4):101364.
4. Ghufraan H, Azam M, Mehmood A, Ashfaq R, **Baig MT**, Malik K, Shahid AA, Riazuddin S. Tumoricidal effects of unprimed and curcumin-primed adipose-derived stem cells on human hepatoma HepG2 cells under oxidative conditions. *Tissue and Cell*. 2022;101968.
5. **Baig MT**, Ghufraan H, Mehmood A, Azam M, Humayun S, Riazuddin S. Vitamin E pretreated Wharton's jelly-derived mesenchymal stem cells attenuate CCl₄-induced hepatocyte injury in vitro and liver fibrosis in vivo. *Biochemical Pharmacology*. 2021;186:114480.
6. Riazuddin S, **Baig MT**, Mehmood A. Cell therapy for liver regeneration. In: *Stem Cells – From Hype to Real Hope*. De Gruyter; 2018.
7. **Baig MT**, Ali G, Awan SJ, Shehzad U, Mehmood A, Mohsin S, Khan SN, Riazuddin S. Serum from CCl₄-induced acute rat injury model induces differentiation of ADSCs towards hepatic cells and reduces liver fibrosis. *Growth Factors*. 2017;35(4–5):144–160.
8. Awan SJ, **Baig MT**, Yaqub F, Tayyeb A, Ali G. In vitro differentiated hepatic oval-like cells enhance hepatic regeneration in CCl₄-induced hepatic injury. *Cell Biology International*. 2016.

Research Metrics: h-index: 5 | Total Citations: 66 | ORCID: 0000-0002-4441-0576

RESEARCH SUPERVISION

M.Phil. | Muhammad Umair (2023)

Cytoprotective and Anti-Cancer Effects of Prunella vulgaris Extract-Primed Human Adipose-Derived Stem Cells under Oxidative Stress Conditions In Vitro

M.Phil. | Hassan Raza Awan (2024)

Role of Vitamin C-Primed Stem Cells and their Exosomes in Ameliorating Liver Fibrosis

M.Phil. | Zaryab Imran (2025)

Naringenin Priming to Enhance Therapeutic Potential of Adipose-Derived Stem Cells for Treatment of Liver Fibrosis

M.Phil. | Isha Maryam (2026)

Preconditioning of Adipose-Derived Mesenchymal Stem Cells with Ziziphus spina-christi Leaf Extract Enhances Their Therapeutic Potential in Experimental Liver Injury

Ph.D. | Farhan Mohi ud Din (Session 2024–2029)

CAR T Cell Therapy for Multiple Myeloma

RESEARCH FUNDING

University of the Punjab Research Grants: PKR 0.2 Million; PKR 0.3 Million

AWARDS & HONOURS

- Two Gold Medals — M.Phil. studies
- Winner, National Science Communication Challenge — 2014
- Merit Scholarship — B.Sc. (Hons.)

TEACHING & ACADEMIC MENTORING

- Postgraduate teaching in molecular biology, biotechnology, bioethics and advances in stem cell research
- M.Phil. and Ph.D. supervision
- Laboratory-based research training
- Mentoring in experimental design, data analysis, scientific presentation, and research dissemination

SELECTED CONFERENCES & PROFESSIONAL DEVELOPMENT

- Workshop: Bench to Bedside: Editing Human Stem Cells with CRISPR-Cas9 for Treating Genetic Disorders — Aga Khan University — 2024
- International Conference: Current Trends, Prospects & Opportunities in Vaccine Research — 2024
- International Conference: Trends and Challenges in Health Sciences — 2023
- 4th International Symposium: Advances in Molecular Biology of Plants and Health Sciences — 2021
- International Conference: Recent Innovations in Molecular Biology — 2019
- Workshop: Ethical Issues Related to Work on Stem Cells — 2009

LEADERSHIP & ACADEMIC SERVICE

- Supervision of postgraduate research students
- Organization of national and international scientific conferences
- Laboratory-based research training and mentoring
- Member, Evaluation Committee of Ph.D. Synopses
- Member, Organizing Committees of International Symposia
- Member, Invigilation Committee for Postgraduate Admission Entry Test

CURRENT RESEARCH & ACADEMIC ACTIVITIES

Research and academic activities in stem cell biology, regenerative medicine, molecular biology, translational cell therapy, and emerging cell-free therapeutic strategies.

LANGUAGES

English — Professional/Academic Proficiency | Urdu — Native/Fluent

REFERENCES

Dr. Azra Mehmood | Associate Professor | Email: azramehmood@cemb.edu.pk | Phone: +92 333 4107008

Dr. Kausar Malik | Professor | Email: kausarbasit786@yahoo.com | Phone: +92 345 8764999

ADDITIONAL INFORMATION

Date of Birth: September 10, 1984. | Nationality: Pakistani | Current Position: Assistant Professor, CEMB, University of the Punjab

Full publication list, detailed research projects, presentations, and supporting documents available upon request.