Bio data/ CV –Azra Mehmood

PROFILE:

AZRA MEHMOOD

Married/ 03 Children

Associate Professor, Centre of Excellence in Molecular Biology (CEMB), University of Punjab, Lahore, Pakistan.

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Year of birth: 1982

SUMMARY:

My group is working on exploitation of regenerative potential of adult stem cells from different sources for the repair of damaged organs predominantly skin (burns, diabetic wounds, aging associated wounds), liver (fibrosis and cirrhosis), and pancreas (diabetes). The group has worked with multiple rodent and human tissue derived cells including bone marrow, keratinocytes, dermal fibroblasts, chondrocytes, hepatocytes, endothelial progenitor cells, adipose and lipoaspirate, cardiomyocytes, umbilical cord blood, wharton's jelly of umbilical cord, and amniotic membrane. The group exploits the regeneration potential of the stem cells for repair of afore mentioned disease conditions mainly in animal disease models. Stem cells are used in combination with chitosan/elastin/gelatin hydrogels, platelet rich plasma, and amniotic membrane scaffolds. Further stem cells are modulated by priming and or supplementation of antioxidants, phytoextracts, and growth factors for improving their therapeutic efficacy via improved paracrine, homing, survival, chemotaxis functions within the oxidative stressed conditions of above-mentioned disease environments. Invitro differentiation techniques are also employed for pluripotency assessment of cells. The efficacy of cell transplantations is adjudged by gene and protein expression analysis of the regenerated tissues via Real time PCR, Western blotting and immunohistology techniques. The group also works with induced pluripotent stem cells derived from dermal fibroblasts and cultures fibroblasts of genetic disease patients for further iPSCs production and disease modeling assays. My research group is also involved in clinical application of stem cells and processed amniotic membrane for treatment of patients of Covid 19, skin reconstruction, diabetic wounds and ocular defects. In this regard, clinical grade wharton's jelly and lipoaspirate stem cells are used per standard protocols for human application. Stem cells are characterized by Flow cytometry and quality tested for screening for any contamination.

EDUCATION:-

Research Fellowship (May, 2009 - Jan. 2012) in Stem cells and regenerative medicine Project after submission of PhD thesis in Punjab university till few months post award of PhD degree

Ph.D. (2006-2011) in Molecular Biology with Thesis title: **"Role of Endothelial progenitor cells in development and therapy of diabetic heart failure"** from Centre of Excellence in Molecular Biology (CEMB), University of Punjab, Lahore, Pakistan

M.Phil (2004-2006) in Molecular Biology from Centre of Excellence in Molecular Biology (CEMB), University of Punjab, Lahore, Pakistan

B.Sc. Hons. (4years) (1999-Dec.2003) in Animal Husbandry from University of Agriculture, Faisalabad, Pakistan

F.Sc. (1997-1999) from FFC Grammar Higher Secondary School, Goth Machhi, Sadiqabad, Distt. Rahim Yar Khan, Pakistan

Matric (1995-1997) from FFC Grammar Higher Secondary School, Goth Machhi, Sadiqabad, Distt. Rahim Yar Khan, Pakistan

SCHOLARSHIPS / AWARDS:

- Incentive Award on research Publications for the years: 2018, 2019, 2020.
- Letter of Appreciation from ORIC, University of the Punjab for research products displayed at "7th Invention to Innovation Summit" held in University of the Punjab on 7-8 March, 2018.
- Research Productivity award for the year 2016-17 by PCST (Pakistan Council for Science and Technology).
- Award of Travel grant of 1000$ for presenting poster at Wound Healing Society, USA, (2017).
- University performance evaluation awards for the years: 2013, 2015, 2018 and 2019.
- Awardee of HEC indigenous PhD scholarship by Higher Education Commission, Pakistan
- Awardee of MPhil scholarship to Unemployed graduates by Higher Education Commission, Pakistan
- Awardee of Workers Welfare Board Merit scholarship by Punjab government throughout the B.Sc.Hons. Animal Husbandry (4yrs) program

RESEARCH SKILLS:-

- Isolation and culture of mesenchymal and endothelial progenitor cells from bone marrow, human and rat adipose derived stem cells, human and rat skin- keratinocytes and fibroblasts, human umbilical cord tissue, human cord blood and amniotic membrane
- Tissue processing of heart, skin and cochlear samples**,** Paraffin and Cryo-sectioning, histochemistry/ cytochemistry, Immuno-flourescence Microscopy
- Real Time PCR
- Hearing assessment in mice by ABR (auditory brain response)
- Surgical techniques for causing myocardial infarction and cell transplantation in rats

- Preparation of skin injury model, diabetes model and liver fibrosis model in rats
- Echocardiography and Millar techniques for murine heart function assessment
- FACS (Flow cytometry) running and data analysis
- Bioluminescence In-vivo Imaging
- Use of primer designing software Primer3
- Use of various image and data analysis softwares like Image J, Adobe photoshop, GraphPad Prism5

FOREIGN LAB RESEARCH EXPERIENCE:

1. ***One year*** (February 2007-February 2008) stem cell research experience **at Department of Pathology and Lab Medicine, University of Cincinnati, Cincinnati, Ohio, USA;** funded jointly by Stem cells research and developmental project Establishment of National Centre for Stem Cells Research and Regenerative medicine", CEMB and by University of Cincinnati, USA.

2. ***Two day*** training on **Bioluminescence In-vivo Imaging system at LiCor Headquarters, Nebraska, USA** (Nov. 15th & 16th, 2017) funded by Pakistan Hospital (sole distributors of LiCor), Pakistan and LiCor Inc., USA.

3. ***Three day*** training at **Lewis Katz School of Medicine, University of Temple, Philadelphia, USA on exosomes isolation from stem cells, their quantification by Nanocyte and their RNA extraction** (Nov. 21st – 23rd, 2017).

INTERNATIONAL CONFERENCES/SYMPOSIA ORGANIZED /ATTENDED:

1. **Organizer** and **Session Co-Chair** at 4th International Symposium on Advances in Molecular Biology of Plants and Health Sciences on Dec. 23-24, 2021, at CEMB, Lahore
2. **Oral presenter** in a webinar symposia "Therapeutic Applications of Pluripotent Stem cells" jointly organized by JBRSC, CEMB, and LRBT, Lahore on Sep. 09, 2020 at Jinnah Burn and Reconstructive Surgery Centre, Lahore
3. Attended by Zoom a Cardiovascular Webinar series Talk "Cardiomyocyte proliferation: Reactivation of developmental signaling" by Dr Mohsin Khan, Temple university, USA on May 4, 2020 at 5pm BST; 12 noon EDT organized by International Society for Heart Research (ISHR), USA.
4. **Organizer and focal person** of "International Symposium on Stem Cells and Regenerative Medicine" held on Nov. 15, 2019 at CEMB.
5. Participated in 7th International symposium on Biomedical Materials Science and Technology Innovation and the Knowledge Economy on Dec. 11-12, 2019 held at Nishat Hotel and Banquet, Emporium Mall, Lahore.
6. **Speaker** at International symposium on Brain, Neurogenetics and Regenerative Medicine held on Oct. 3, 2019 at CEMB.
7. **Organizer and focal person** of the International symposium on Brain, Neurogenetics and Regenerative Medicine held on Oct. 3, 2019 at CEMB.

8. Participated in Hands on Training Workshop on Crispr/ Cas9 Genome Editing Technology held on April 29-30, 2019 at CEMB.
9. Maria Tayyab Baig, Azra Mehmood, Ghufran Azam and Sheikh Riazuddin. Vitamin E resolves CCl4 induced hepatocyte injury in vitro. Poster presented at International Conference at Punjab University (ICPU, 2019) on Recent Innovations in Molecular Sciences from November 6-8, 2019.
10. Hira Butt, Azra Mehmood, Shamsa Humayun and Sheikh Riazuddin. (2019) Epigallocatechin gallate confers protection against oxidative stress in human Wharton's jelly derived mesenchymal stem cells. Poster #113 presented at International Conference at Punjab University (ICPU, 2019) on Recent Innovations in Molecular Sciences from November 6-8, 2019.
11. Ramla Ashfaq, Xia Cao, Yu Shrike Zhang, Azra Mehmood, Sheikh Riazuddin. (2019) Applications of GelMa hydrogel in tissue engineering and repair. Poster#116 presented at International Conference at Punjab University (ICPU, 2019) on Recent Innovations in Molecular Sciences from November 6-8, 2019.
12. Waqas Ahmad, Hira Butt, Safana Farooq, Azra Mehmood, Sheikh Riazuddin. N-Acetyl-L-Cystein aided protection of stem cells against hyperglycemia. Poster presentation at 14th International symposium on natural products of future from November 6-8, 2019 at HEJ Research Institute of Chemistry - International Center for Chemical and Biological Sciences, Karachi University, Karachi.
13. **Oral presentation** by Dr Azra Mehmood and entitled as: "Regenerative medicine: Stem cells based therapies" in Scientific Symposium on Brain Neurogenetics and Regenerative Medicine, at CEMB on October 3, 2019.
14. **Oral Presentation** entitled: "Stem cells for organ repair" at one day "International Symposium on Stem cells and Cancer Biology" on March 14, 2019, at University of Lahore, Lahore, Pakistan
15. **Organizing** committee member of International Symposium on Advances in Molecular Biology of Plants and Health Sciences (19^{th} -21^{st} Dec., 2018) held at CEMB.
16. A Ali, A Mehmood, S Riazuddin. (2018) Stem cell-derived biosynthetic skin accelerates wound healing. Accepted for Poster presentation at 2018 **American Academy of Dermatology Summer Meeting, Chicago, Ill, July 26-29, 2018.** Poster publication in JOURNAL OF THE AMERICAN ACADEMY OF DERMATOLOGY 79 (3), AB270-AB270.
17. Presentation on "Overview of stem cells research at CEMB" at Hands on training workshop and lecture series at CEMB, organized in collaboration with foreign experts from Univ. of Miami, USA, from Jan. 2-5, 2018.
18. **Focal person** in organizing hands on training workshop and lecture series by foreign experts from Univ. of Miami on GMP & GTP guidelines by US FDA for scale up production of qualified stem cells for clinical application under Pakistan program of collaborative research (PPCR) program of HEC. The training workshop and lecture series was held from Jan. 2-5, 2018 for stem cells group members specifically.
19. **Oral presentation** by Dr Azra Mehmood at 6th International symposium on Biomedical Materials: Synergising Partnerships (14-16 Dec., 2017), entitled "Stem cells based approaches for wound repair" at PC Lahore organized by IRCBM, COMSATS, Lahore.
20. A Mehmood, A Afzal, SN Khan, S Riazuddin. Vitamin E improves efficacy of adipose derived MSCs for the repair of chemical wounds. (Accepted for **poster presentation at Wound Healing Society meeting held at San Diego, California, USA; April 5-9, 2017**). Published in journal of Wound Repair and Regeneration.
21. **Oral presentation** at 6^{th} International symposium on Biomedical Materials: Synergising Partnerships (14-16 Dec., 2017), entitled "Stem cells based approaches for wound repair" at PC Lahore organized by IRCBM, COMSATS, Lahore.

22. **Organizing** committee member of International Symposium on Advances in Molecular Biology of Plants and Health Sciences (20th -23rd Nov., 2017) held at CEMB.
23. **Organized/** arranged a webinar on "BioRad S3e cell sorter and cell biological techniques" at CEMB on 30th January, 2017at CEMB, and delivered by Dr. Imad Aoude, Application Specialist Scientist, BioRad.
24. **Oral presentation** at 5th International Symposium on Biomedical Materials: Clinical Requirements and Regulatory Affairs (14 - 16 December 2016) at PC, Lahore organized by COMSATS, Lahore.
25. Attended a seminar on "Phen-Gen combining phenotypes and genotypes to analyze rare disorders" by Dr. Asif Javed, Research Scientist at Genome Institute of Singapore, 2nd November, 2016, organized by CEMB.
26. Dental and on biomaterials summer camp held at COMSATS Lahore from 15-19th August, 2016.
27. **Oral Presentation** on "Role of stem cells in repair of skin damages" at Conference on Therapeutic Applications of Stem Cells (5th -6th May, 2016, The University of Lahore, Lahore)
28. Attended **Biosafety workshop** held at CEMB in 2016.
29. **Organizing** committee member of International Symposium on Advances in Molecular Biology of Plants and Health Sciences (29th -31st December, 2015) held at CEMB.
30. Azra Mehmood, Ruhma Mehmood, Awais Afzal, Hira Butt, Shaheen N Khan, Sheikh Riazuddin. Preconditioning of stem cells for the repair of burnt skin. **Oral presentation** at International Symposium on Advances in Molecular Biology of Plants and Health Sciences (29th -31st December, 2015) held at CEMB, University of Punjab, Lahore.
31. Muhammad Sohail Anjum, **Azra Mehmood**, Muhammad Ali, Shaheen N Khan, Sheikh Riazuddin. Preconditioning of insulin producing cells renders them resistant to hyperglycemic stress. **Best poster award** at International Symposium on Advances in Molecular Biology of Plants and Health Sciences (29th -31st December, 2015) held at CEMB, University of Punjab, Lahore.
32. Participant of **23rd Master Trainers-Faculty Professional Development** Program (MT-FPDP) at Learning Innovation Division (LID) of **HEC, Islamabad** (held from November 10 to December 31, 2014).
33. International symposium on Molecular Forensic: Emerging Trends held on 29th May, 2014 at Univ. of Health Sciences, Lahore.
34. **Azra Mehmood**, Mohsin Khan, Sadia Mohsin, Shoaib Akhtar, Fatima Ali, Muhammad Ali, Shaheen N. Khan and Sheikh Riazuddin. Preconditioning of Stem Cells for the Repair of Diabetic Myocardium. **Oral presentation** at 11th Biennial Conference Molecular Biosciences - Challenges and Opportunities (November 25 – 28, 2013) at the University of the Punjab, Lahore.
35. 7th Reconstructive Microsurgery Course and Burn Symposium (Nov. 4th-8th, 2013) held at Jinnah Burn and Reconstructive Surgery Centre, Lahore.
36. **Azra Mehmood**, Muhammad Ali, Shaheen N. Khan and Sheikh Riazuddin. Diazoxide improves the ability of Endothelial Progenitor Cells to repair the infarcted heart. 2013. **Oral**

presentation at 4th International Symposium cum-Training course on Molecular Medicine and Drug Research, HEJ, University of Karachi.

37. DNA day and NAYS Emerging Ideas Conference held at Centre of Excellence in Molecular Biology Lahore on 25th April 2013.
38. 4th International Symposium cum-Training course on Molecular Medicine and Drug Research, HEJ, University of Karachi, (January 7-10, 2013), Karachi.
39. International symposium on Biotechnology applications in new emerging fields (December 21-23, 2010) at Allama Iqbal Medical College, Lahore.
40. Training on Flow cytometry from BD Pakistan (May 19-20, 2008) at University of Health Sciences, Lahore.
41. **International meeting of American Heart Association from November 4-7, 2007 at Orlando, USA**.
42. Binasia workshop in CEMB, Lahore, Pakistan (2006).
43. FAOMB workshop in CEMB, Lahore, Pakistan (2006).
44. European Union Asia Link Project short course on Livestock Ecology, Sustainable Land Use and Livestock Systems (January 12-24, 2004) held at University of Agriculture, Faisalabad.

EMPLOYMENT RECORD: -

- **Associate Professor (BPS-20)** at CEMB, University of Punjab, Lahore (from June, 2018 to date)
- **Assistant Professor** (permanent BPS-19) in CEMB, Univ. of Punjab, Lahore (Since Feb., 2013 to June 26, 2018)
- **Assistant Professor** (on contract) in CEMB, Univ. of Punjab, Lahore (Jan., 2012 to Feb., 2013).
- **Post Doc Fellow** in CEMB, Univ. of Punjab, Lahore (May, 2009 to Jan., 2012).

JOB RESPONSIBILITIES/ PROGRESS:

I did my PhD on role of endothelial progenitor cells in development and therapy of diabetic heart failure from this same institute. During my PhD i did part of my work at university of Cincinnati, Ohio, as well under mentorship of Professor M. Ashraf for one year duration. After i came back to my parent institute i submitted my thesis in a year and also helped all my juniors finish their stem cells related PhD and MPhil projects. I worked with them in project designing, conduct of their experiments to data analysis and thesis write-up. Hence I strengthened my lab in Pakistan.

After my PhD, i have worked on stem cells based osteoarthritis repair and we published two papers in Osteoarthritis and Cartilage journal and one in Differentiation journal while working solely in my Pakistani lab. Later i have worked on diabetes and liver fibrosis repair by stem cells strategies and published it as well. Now i'm working on repair of stem cells using strategies like growth factors, hydrogels and amniotic membrane combinations with various types of stem cells such adipose, wharton's jelly, bone marrow, skin cells, for wound healing in conditions like burns, aging, acid burns etc.

Currently, I'm working as **in-charge Stem Cells Therapeutics group at CEMB** and two senior research officers are working with me. Besides, basic research, my group is also involved in clinical trials of stem cells as well. The clinical application of this work can provide high quality effective treatment options to patients in Pakistan.

1. ***Research Projects and GRANTS*:**

- Have worked and supervised the stem cell related research for the repair of osteoarthritis, damaged skin, infarcted heart, diabetes, and renal ischemia at CEMB, University of Punjab, Lahore. Currently my work is focused on skin repair especially burn repair by scaffold assisted stem cells strategies.

- Completed an HEC approved SRGP project entitled: "**Comparison of differentiation potential of bone marrow derived and adipose derived mesenchymal stem cells towards nephrogenic lineage**" in 2013-14 as **Co-PI.**

- Completed an NRPU project as **PI** (Feb. 2017-2019) entitled "**Exploitation of stem cells for the repair of damaged skin**" (3.56 million rupees) from HEC, Pakistan.

- Completed an SRGP project **"Efficacy of combination of antioxidants in protecting MSCs against oxidative stress"** (Nov. 2016-Nov. 2017) of approximately 0.5million rupees as **Co-PI.**

- **PI** of TDF project entitled "Development of cell replacements for repair of damaged and diseased organs" worth **13.01 million rupees** approved under Technology development fund (project # TDF02-163).

- **Co-PI** of an ongoing NRPU project Project # 14181 entitled "Amniotic membrane embedded phytoextract primed stem cells construct for wound healing" under NRPU projects Call 2020 worth 6.7 million rupees

2. ***Teaching& Research supervision:***

- Overall incharge for teaching a 4 credit hr course to PhD class entitled "Advance course for stem cells" at CEMB.
- Supervised up till now **31 MPhil and 8 PhD** students awarded degrees. Majority of the PhD students have worked 6months each in various top ranking labs which include:

  Janowski lab, John Hopkins, USA;
  Prof Anthony Atala's Lab, Wake Forest Institute of Regenerative Medicine (WFIRM), USA;
  Prof Khadim Hosseini lab, MIT, USA;
  Gurdon Institute, UK

3. ***Regular lab services*:**

- Incharge Flow cytometry facility at Stem cells lab at CEMB, University of Punjab, Lahore. Take care of regular cleaning, maintenance and calibration of Flow cytometer machine as well as do Flow cytometry for Stem cells lab students.
- Take care of Flourescence microscopy facility.
- Incharge Animal house facility at CEMB.
- Work for regular lab maintenance, purchase of equipment, chemicals and reagents.
- Incharge of Live animal In-vivo Imaging system. Also participated in foreign training organized by LiCor for use of this system.

4. ***Administration*:**

- Member of Disciplinary committee at CEMB.
- Animal Ethics Committee at CEMB.
- Member of "Research Project Review Committee" of the Centre.
- Member of Doctoral program Committee at CEMB.
- Member of "Safe disposal of Biological and Chemical Waste Committee" of CEMB.
- Member of "Women Committee" of CEMB.
- Member of MPhil/ PhD student "Admission Committee" at CEMB and is involved in examination/ entry test, member of interview board, paper checking and final selection of students for admission in MPhil/PhD at CEMB.
- Invigilation group Incharge during entry test for MPhil/PhD admission at CEMB for the year 2017
- Invigilation Team Member during entry test for MPhil/PhD admissions at CEMB for the year 2016
- Member of "Departmental Promotion Committee"
- Was nominated by CEMB to perform duties during 2017 convocation at University of Punjab, Lahore.
- Above all the most fundamental administrative achievement, being incharge stem cells facility at CEMB, is successful shifting of stem cells lab (including all the equipments) to the new building of Stem Cells Centre during early 2016. The building was made functional first which included movement and installation of sophisticated high quality biosafety cabinets with 100% exhaust of circulated air. Me and my team got installed eight biosafety cabinets, -80freezer, setup of liquid nitrogen facility, shifting and reinstallation of Flow cytometer and fluorescent microscopes besides the other general lab equipments. Arrangement of furniture, blinds, etc. We worked hard for functioning of the Stem cells centre building esp. during 2015-2016. Currently I'm also working for upgradation of the existing facility into a GMP facility for conduct of work on production of clinically qualified stem cells appropriate for injection/ transplantation in patients.

COLLABORATION WITH OTHER INSTITUTES/ UNIVERSITIES

- Collaboration with Lewis Katz School of Medicine, Temple University, Philadelphia, USA.
- Collaboration with Interdisciplinary Stem Cells Institute at University of Miami, USA.

- Training of students from other institutes/ universities.
- Member of Board of studies at Shaheed Zulfiqar Ali Bhutto Medical university (SZAMBU), Islamabad
- Research collaboration with Inter disciplinary Research Centre for Biomedical Materials (IRCBM), COMSATS, Lahore
- Collaboration with Jinnah Burn Centre, Allama Iqbal Medical College, Lahore; Gynae Dept. Ganga ram hospital, Lahore
- Collaboration with Institute of Chemistry, University of Punjab, Lahore

PATENTS:

- Patent entitled *"Production of vitamin E primed fibroblasts carrier plasma gel for treatment of diabetic wounds"* has been filed in Patent office, Pakistan on Sep. 14, 2020, vide Patent Application# 591/ 2020.

ABSTRACTS PRESENTATION AT FOREIGN MEETINGS:

- Oral abstract accepted for Wound healing Society Meeting year 2020, USA. Abstract title: Hira Butt, **Azra Mehmood**, Ansa Andleeb, Ramla Ashfaq, Hafiz Ghufran, Maryam Azam, Amna Ramzan, Sheikh Riazuddin. Epigallocatechin-3-gallate Primed Human Wharton'S Jelly Derived Mesenchymal Stem Cells Seeded Hydrogel Construct Improves Healing Of Thermal Burns. (Travel grant awarded to the first author)

- Poster abstract accepted for Wound healing Society Meeting year 2020, USA. Ramla Ashfaq, **Azra Mehmood**, Xia Cao, Sheikh Riazuddin. In Vivo Healing Of Burn Wounds Using Human Cord Derived Stem Cells Embedded In A Collagen Based Construct.

- A Ali, **A Mehmood**, S Riazuddin. (2018) Stem cell-derived biosynthetic skin accelerates wound healing. JOURNAL OF THE AMERICAN ACADEMY OF DERMATOLOGY 79 (3), AB270-AB270. Poster presentation at Annual meeting of American Academy of Dermatology in 2018, USA

- **A Mehmood**, A Afzal, SN Khan, S Riazuddin. Vitamin E improves efficacy of adipose derived MSCs for the repair of chemical wounds. (**Accepted for poster presentation at Wound Healing Society meeting to be held at San Diego, California, USA; April 5-9, 2017**). Travel grant of 1000$ awarded to the first author.

- **A Mehmood**, H Butt, M Ali, MN Tarar, SN Khan, S Riazuddin. Vitamin E Renders Culture Expanded Keratinocytes and Fibroblasts Resistant to Burn Injury. (**Accepted for Poster presentation at TERMIS-Americas Conference and Exhibition San Diego, CA December 11–14, 2016**).

- Muhammad Shareef Masoud**, Azra Mehmood**, Sanam Saiqa Anwar, Muhammad Zeeshan Afzal, Shaheen N. Khan. Pre-conditioning augments mesenchymal stem cells survival and engraftment in renal ischemia reperfusion. 2010. OSa017. Abstract accepted for presentation.

PUBLICATIONS and Book chapters:

1. Amna Ramzan, **Azra Mehmood**, Ramla Ashfaq, Anisa Andleeb, Hira Butt, Saima Zulfiqar, Muhammad Nasir, Anwarul Hasan, Shehla Javed Akram, Kamran Khalid, Muhammad Yar, Kausar Malik, Sheikh Riazuddin. Freeze gelation (chitosan-elastin-sodium alginate)/ zinc oxide nanocomposite gel with enhanced adipose stem cell proliferation and antibacterial properties. International Journal of Biological Macromolecules (accepted, 2023)

2. H.M. Shifa ul Haq, Ramla Ashfaq, **Azra Mehmood**, Warda Shahid, Hafiz Ghufran Azam, Maryam Azam, Saba Tasneem, Shehla Javed Akram, Kausar Malik, Sheikh Riazuddin, Priming with caffeic acid enhances the potential and survival ability of human adipose-derived stem cells to counteract hypoxia, Regenerative Therapy, Volume 22, 2023, Pages 115-127

3. Khan A, Andleeb A, Azam M, Tehseen S, **Mehmood A**, Yar M. Aloe vera and ofloxacin incorporated chitosan hydrogels show antibacterial activity, stimulate angiogenesis and accelerate wound healing in full thickness rat model. J Biomed Mater Res B Appl Biomater. 2023 Feb;111(2):331-342. doi: 10.1002/jbm.b.35153.

4. Azam M, Ghufran H, Tasneem S, **Mehmood A**, Malik K, Yousaf MA, Tarar MN, Akram SJ, Riazuddin S. Priming of adipose-derived stem cells with curcumin prior to cryopreservation preserves their functional potency: Towards an 'Off-the-shelf' therapy for burns. Cryobiology. 2022 Dec 5: S0011-2240(22)00370-4. doi: 10.1016/j.cryobiol.2022.12.001.

5. Ghufran 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 Cell. 2022 Dec; 79:101968.

6. Anisa Andleeb, **Azra Mehmood**, Muhammad Tariq, Hira Butt, Rashid Ahmed, Aneeta Andleeb, Hafiz Ghufran, Amna Ramzan, Asim Ejaz, Kausar Malik, Sheikh Riazuddin, Hydrogel patch with pretreated stem cells accelerates wound closure in diabetic rats, Biomaterials Advances, Volume 142, 2022, 213150, ISSN 2772-9508

7. Hafiz Ghufran, Maryam Azam, **Azra Mehmood**, Hira Butt, Sheikh Riazuddin. Standardization of diethylnitrosamine-induced hepatocellular carcinoma rat model with time based molecular assessment, Experimental and Molecular Pathology, Volume 123, 2021, 104715, ISSN 0014-4800.

8. Maryam Azam, Hafiz Ghufran, Hira Butt, **Azra Mehmood**, Ramla Ashfaq, Asad M Ilyas, Muhammad R Ahmad, Sheikh Riazuddin, Curcumin preconditioning enhances the efficacy of adipose-derived mesenchymal stem cells to accelerate healing of burn wounds, *Burns & Trauma*, Volume 9, 2021, tkab021, https://doi.org/10.1093/burnst/tkab021

9. Andleeb, Anisa, Aneeta Andleeb, Salman Asghar, Gouhar Zaman, Muhammad Tariq, **Azra Mehmood**, Muhammad Nadeem, Christophe Hano, Jose M. Lorenzo, and Bilal H. Abbasi (2021). "A Systematic Review of Biosynthesized Metallic Nanoparticles as a Promising Anti-Cancer-Strategy" *Cancers* 13, no. 11: 2818.

10. Maria Tayyab Baig, Hafiz Ghufran, **Azra Mehmood**, Maryam Azam, Shamsa Humayun, Sheikh Riazuddin (2021). Vitamin E pretreated Wharton's jelly-derived mesenchymal stem cells attenuate CCl4-induced hepatocyte injury in vitro and liver fibrosis in vivo. Biochemical Pharmacology, 186: 114480, ISSN 0006-2952,

11. Waliya Zubairi[a,b], Mubashra Zehra[a,c], **Azra Mehmood**[c], Farasat Iqbal[a], Rida Badar[a], Anwarul Hasan[d,e], and Muhammad Yar[a]· Evaluation of angiogenic potential of heparin and thyroxine releasing wound dressings. International Journal Of Polymeric Materials And Polymeric Biomaterials 2022, VOL. 71, NO. 15, 1164-1175

12. Waris, T. S., Shah, S. T. A., **Mehmood, A**., Iqbal, Z., Zehra, M., Chaudhry, A. A., Rehman, I. U., & Yar, M. (2022). Design and development of thyroxine/heparin releasing affordable cotton dressings to treat chronic wounds. *Journal of Tissue Engineering and Regenerative Medicine*, 16(5), 460– 471.

13. Zunaira Huma Ghauri, Atif Islam, Muhammad Abdul Qadir, Abdul Ghaffar, Nafisa Gull, Maryam Azam, **Azra Mehmood**, Atif Ali Ghauri, Rafi Ullah Khan, Novel pH-responsive chitosan/sodium alginate/PEG based hydrogels for release of sodium ceftriaxone, Materials Chemistry and Physics, Volume 277, 2022, 125456, ISSN 0254-0584.

14. Ata, Sadia, Amin, Sadaf, Bibi, Ismat, Mohsin, Ijaz-ul-, Islam, Atif, **Mehmood, Azra**, Irshad, Saba, Al-Fawzan, Foziah F., Alissa, Siham A. and Iqbal, Munawar. "Kinetics of methylene blue dye adsorptive removal using halloysite nanocomposite hydrogels" *Zeitschrift für Physikalische Chemie*, vol. 236, no. 3, 2022, pp. 373-385.

15. Ashraf, H., Meer, B., Iqbal, J., …..**Mehmood A**,… *et al.* Comparative evaluation of chemically and green synthesized zinc oxide nanoparticles: their in vitro antioxidant, antimicrobial, cytotoxic and anticancer potential towards HepG2 cell line. *J Nanostruct Chem* (2022).

16. Amna Farooq, Ariba Farooq, Sehrish Jabeen, Atif Islam, Nafisa Gull, Rafi Ullah Khan, H.M. Shifa ul Haq, **Azra Mehmood**, Nazim Hussain, Muhammad Bilal, Designing Kappa-carrageenan/guar gum/polyvinyl alcohol-based pH-responsive silane-crosslinked hydrogels for controlled release of cephradine, Journal of Drug Delivery Science and Technology, Volume 67, 2022, 102969, ISSN 1773-2247.

17. Rehmat S, Rizvi NB, Khan SU, Ghaffar A, Islam A, Khan RU, **Mehmood A**, Butt H and Rizwan M (2022) Novel Stimuli-Responsive Pectin-PVP-Functionalized Clay Based Smart Hydrogels for Drug Delivery and Controlled Release Application. Front. Mater. 9:823545. doi: 10.3389/fmats.2022.823545

18. Samra Liaqat, M islam , Hamid Saeed, Mehwish Iqtedar, **Azra Mehmood**. Investigation of Olea ferruginea Roylebark extracts for potential in vitro antidiabetic and anticancer effects. Turk J Chem (2021) 45: 92-103

19. Ali Asif, Ikram Fakhera, Iqbal Farasat, Fatima Hira, **Mehmood Azra**, Kolawole Maruf Yinka, Chaudhry Aqif Anwar, Siddiqi Saadat Anwar, Rehman Ihtesham Ur. (2021). Improving the in vitro Degradation, Mechanical

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