

CURRICULUM VITAE

PERSONAL & SUMMARY INFORMATION

Name:	Dr. Muhammad Afzal, Ph.D. in Basic Medical Sciences (Biochemistry)
Date of Birth:	May 9, 1985 Sialkot, Pakistan
Office:	Department of Biomedical Sciences, Pak-Austria Fachhochschule: Institute of Applied Sciences and Technology (PAF-IAST), Khanpur Road, Mang Haripur, Khyber Pakhtunkhwa.
Home:	House # 05, St. # 27, H-block, Soan Garden Islamabad
E-mail:	mafzal.irtaza@gmail.com muhhammad.afzal@paf-iast.edu.pk
Mobile:	+92-332-4745411
URL/ORCID iD:	https://orcid.org/0000-0002-5785-6067
Google Scholar Link:	https://scholar.google.com.pk/citations?user=8uCPOw8AAAAJ&hl=en
Total Experience:	> 11 years Overall
Pre-PhD	08 year(s) 09 month(s) 11 days(s)
Post-Ph.D.	> 03 years
Publications	27
Research Supervision	HEC-approved Ph.D. supervisor (Ref # HEC/HRD/ASA/2021/89552)

Research Interests

Investigations of resistance to anti-cancer treatments leads to the survival of tumor cells and cancer progression. My research plan is to investigate the molecular mechanisms to induce cell death in patient-derived xenograft (PDX) and cancer cell-line models using alternative anti-cancer agents or molecular inhibitors to target the anti-apoptotic markers which may provide new insights on the efficacy of co-treatments to improve current cancer therapies. Additionally, I also have interests in translational molecular medicine to develop cost-effective molecular screening assays using cellular and circulating cell-free DNA for the early detection of familial/hereditary cancers and prenatal abnormalities.

EDUCATION

Ph. D (Basic Medical Sciences)	(Biochemistry) Riphah International University, Islamabad, 2020
M. Phil	(Biochemistry & Molecular Biology) Quaid-i-Azam University-Islamabad, 2014
M.Sc.	(Biochemistry) University of Agriculture Faisalabad, 2010
B.Sc. MLT	Medical Laboratory Technology University of Health Sciences, Lahore, 2008
PGD Diploma	Postgraduate Diploma in professional ethics and teaching methodologies, Riphah International University, Islamabad, 2018

Dissertations:

- **Ph. D Thesis:** Impact of Altered-CK2 Activity on Intracellular Ca²⁺ Homeostasis and Protein Expression in Prostate Cancer Cell-lines Models.
- **M. Phil Thesis:** HER2 Proto-oncogene Amplification by Dual-probe FISH Assay: A Cohort Study on 154 IHC-equivocal Cases of Breast Carcinoma Patients
- **M. Sc. Thesis:** Differential gene expression in Allium sativum after fungal induction

Professional Experiences:

2024 - present	Assistant Professor, Biomedical Sciences Department of Biomedical Sciences, Pak-Austria Fachhochschule: Institute of Applied Sciences and Technology (PAF-IAST)
2021 - 2024	Assistant Professor, Biochemistry Faculty of Health and Medical Sciences and multidisciplinary post-graduate research Lab, Al-Mizan Campus, Islamic International Medical College, Riphah International University, Islamabad-Pakistan
2013 - 2021	Scientific Officer Biochemistry department and multidisciplinary post-graduate research Lab, Al-Mizan Campus, Islamic International Medical College, Riphah International University, Islamabad-Pakistan
2010 - 2012	Sr. Medical Technologist Shaukat Khanum Memorial Hospital and Research Centre Lahore

Work Experience:**Hands-on Experience****1. Samples handling and storage.**

- Whole blood, Serum, Plasma, Animal/Human Tissues, and Human Cell lines.
- Storage handling of samples in ultra-low temperature freezer up to -80 C°
- Liquid nitrogen storage

2. Clinical Chemistry Assays:

- Liver, Heart, Kidney, lipid profiles, and other chemistry tests on manual and automated types of equipment.
- Clinical Chemistry Analyzer: Microlab300 Merck Nether Land

3. Hematology

- Routine Hematology
- Coagulation Assays: PT, APTT, Thrombin, FD, D-Dimers Coagulation Factors
- Blood Cell Analyzers: Automated Hematology Analyzer Sysmex; XE5000, XE2100
- Special Coagulation Analyzer CA1500, CA500

4. Immunoassays

- ELISA Machine (BioTek ELx800 Micro-plate Reader USA) for tissue antigens, hormones, Vitamins, and infectious diseases

- VIDAS and MINI-VIDAS automated special chemistry analyzer for immunoassays

5. Molecular Biology Techniques

- DNA/RNA isolation from whole blood, tissues, cultured cells, and biological fluids
- Cell-free DNA/RNA and miRNAs isolations
- Protein and mitochondrial purification from cultured cells
- Primers and probs designing (manual and software-based)
- cDNA synthesis
- Conventional PCR (PCR Thermal Cycler – 25, Major Sciences USA)
- Gradient PCR, (Applied Biosystems brand of Thermofisher USA)
- RT-qRT-PCR (Rotor Gene-Q, Qiagen)
- Electrophoresis (Gel Midi Horizontal, Major Sciences USA)
- PAGE Electrophoresis DNA/Protein
- Gel documentation System (Syngene UK)
- Western Blotting (BioRad)
- Genotyping and Mutation Analysis

6. Human Cell Culturing

7. Fluorescence Assays

- Microplate Fluorescence assays (Molecular Devices USA)
- Fluorescence Microscopy Assays (Life Technologies)

Research Software and Computer Skills

- SPSS
- GraphPad Prism 5.0
- Gen5™ Data Analysis software to Control BioTek Readers, Data Export and Reporting Files
- GeneSys Image Acquisition Software on Gel Doc System GYNGENE
- EndNote Software
- TurboScan Densitometer Software For Electrophoresis Biotec-Fischer GmbH Germany

Training/Certificates

- Postgraduate Diploma in PROFESSIONAL ETHICS and TEACHING METHODOLOGIES
- Training workshop on “Conflict Management”
- Training Work Shop on research types of equipment by Rays Technologies

Honor/Award

- Ph. D. research fellowship (2018) in a world-leading 5th ranked pathology department/Cancer Centre of the University of Minnesota U.S.A under the HEC International Research Support Initiative Program.

Seminar/Workshops

- "Research Planning and Writing" Riphah Academy and Research Enhancement (RARE) workshop on Feb 2014
- "Stress Management". by DR. Muhammad Iqbal as a Speaker; Jan 2015, Al-Mizan Campus, Riphah International University

- “Nucleic acid extraction DNA/RNA and PCR applications”
- “PCR applications in Hereditary Diseases”

Invited Talks and Presentations

- September 2015: Invited as a Speaker for "Scientific Search Engines". One Day Training Program on Essential of Proposal Writing, 4th September 2015 at Isra University, Islamabad May 2017
- Invited as a Speaker for ASAB-NUST- University OPEN HOUSE 2017

Peer-Reviewed Articles

- Journal; Tumor Biology Manuscript Number: TUBI-D-15-00601; Title: XPD, APE1, and MUTYH polymorphisms increase head and neck cancer risk: effect of gene-gene and gene-environment interactions.
- Manuscript Number: AJB-06.06.14-13965; Manuscript Title: Molecular detection of Hepatitis A Virus (HAV) and other important diseases for public health on strawberries from Guanajuato, México.
- The International Journal for Biotechnology and Molecular Biology Research (IJBMBR); Manuscript Number; IJBMBR-03.02.15-0222 Manuscript Title: Molecular Analysis of Bacterial Diversity of Activated Sludge of Common Effluent Treatment Plant.

Research Grants

1. Non-invasive Prenatal Diagnosis of Beta-thalassemia for Common Mutations in Pakistan: A Comparative Diagnosis using Cell-free Fetal DNA from Maternal plasma and Chorionic Villus Sampling. A total cost of PKR 150000/-. ORIC research grant letter 2020-21/Riphah International University. **Co-investigator**
2. Development of Non-invasive Prenatal Aneuploidy testing in Pakistan Using Cell-free Fetal DNA from Maternal Plasma " at a total Cost of Rs. 150000/-. Project No: Riphah-ORIC-21-22/FHMS-31. ORIC Research Grant Award Letter 2021-22/ Riphah International University. **Principal-investigator.**
3. Clinical role of MOV10 and its polymorphism (rs2932538) in preeclampsia patients of Pakistani population. A total cost of PKR 150000/-. ORIC research grant letter 2020-21/Riphah International University. **Co-investigator**
4. **Development of Non-invasive Prenatal Aneuploidy testing in Pakistan Using Cell-free Fetal DNA from Maternal plasma.** A total cost of PKR 150000/-. ORIC research grant letter 2020-21/Riphah International University. **Principal investigator**

Research Project (s) of Ph.D. Students Conducted as a Research Associate

1. Association of MiRNAs genes polymorphism with the expression of target binding genes in Pakistani breast cancer females. Biochemistry-completed
2. Association of Vascular Endothelial Growth Factor (VEGF) Gene and Receptor for Advanced Glycation End Products (RAGE) Gene Polymorphisms with Non-proliferative and Proliferative Diabetic Retinopathy in Type II Diabetic Patients in Pakistani Population Pathology-completed.
3. Impact of Altered-CK2 Activity on Intracellular Ca²⁺ Homeostasis and Protein Expression in Prostate Cancer Cell-lines Models. Biochemistry-Completed
4. Immunomodulatory effect of metal complexes of triterpenoids in airway inflammation rate model. Pharmacology-Completed

5. Analysis of recurrent mutations and STRs polymorphism in hemophilia-A patients. Hematology-Running
6. Association of genetic polymorphisms of MATE-1 and MATE-2 on metformin therapeutic type 2 diabetic patients. Pharmacology-Running
7. Analysis of recurrent mutations of coagulation factor genes in association with venous thrombosis.Hematology-Running.
8. Differential Expression of Cancer-Associated Plasma miRNAs in the Ordnance Factory Workers, Exposed to 2,4,6-Trinitrotoluene. Chemical Pathology. Completed.

Student Supervision					
Sr #	Student Name	Year	Degree/University	Role	Title
8	Dr. Bushra Ghulam	2024	MPhil Biochemistry/ Riphah International University	Supervisor	Molecular Detection of recurrent Variants in BRCA 1/2 Genes in Breast Cancer Patients of Pakistani Population.
7	Dr Zahira Bashir	2024	Same as above	Supervisor	Molecular Detection of recurrent Variants in BRCA 1/2 Genes in Ovarian Cancer Patients of Pakistani Population.
6	Dr Naila Zakria	2024	Same as above	Co-supervisor	Association of MAP Kinase Gene Polymorphism in Patients of Temporomandibular Disorders with Psychological Stress
5	Dr. Iram Nasir	2024	Same as above	Co-supervisor	Association of Genetic Polymorphism TNC2 and SLC19A1 in Pre-eclamptic Patients of Pakistani Population
4	Dr. Saadia Sadiq	2022	Same as above	Supervisor	Clinical significance of TMPRSS2 gene polymorphism (rs12329760) and its correlation with a prostate-specific antigen in prostate cancer.
3	Dr. Samarah Naeem	2022	Same as above	Supervisor	Association of CAMK4 gene polymorphism rs2300782 with diabetic retinopathy in Pakistani population.
2	Dr. Iqra Anwar	2022	Same as above	Co-supervisor	Association of HLA-DRB1 Gene polymorphism rs6457617 in Rheumatoid Arthritis patients with and without depression.
1	Dr. Sahar Ikram	2022	Same as above	Co-supervisor	Association of PDLIM4 gene variants (rs:3900945) in comparison with

					diagnostic bone biomarkers in osteoporosis.
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Publications:

Sr. #	Authors/Title/etc.	Year	Impact factor	HEC Cat.
vii	Bushra Ghulam, Muhammad Afzal et al. Molecular Profiling of BRCA1/BRCA2 Gene Variants in Pakistani Breast Cancer Patients. 2023. Manuscript ID: JPMA-2023- 11098. Submitted	2023		X
Vi	Zahira Bashir, Muhammad Afzal et al. Tetra ARMS-PCR: A Cost-effective Method to Identify BRCA1/2 Gene Variants in Ovarian Cancer Patients in Pakistan Population. 2023. ID JPMA-2023-11097. Submitted	2023		X
V	Iram Nasir. Amena Rahim, Muhammad Afzal et al. Association of SLC19A1(rs1051296 G>T) and TCN2(rs2336573 C>T) with pre eclampsia in different ethnic groups of Pakistan. Oct-2023.JCPSP. Submitted	2023		X
Iv	Naila. Amena Rahim, Muhammad Afzal et al.Considering G>A polymorphism of COMT gene (rs4680), the genetic cause of stress induced TMD in medical students. A case control study. JPMA-2023-11095. Submitted	2023		X
iii	Amena Rahim, Shabana Ali,..Muhammad Afzal.."Association of single nucleotide polymorphism of STK39 rs3754777 with preeclampsia in Pakistani females" to ID JPMA-2023-20004. Submitted	2023		X
ii	Saadia Sadiq, Amena Rahim, Muhammad Afzal , Sahar Ikram, Tehseen Ashraf Kohistani, Farzana Munir. Genetic Polymorphism of <i>TPRSS2</i> Gene (rs12329760) and its Expression in Different Ethnicities in Prostate Cancer Patients. (Dec.2023). PAFMJ ACCEPTED	2023	—	Y
i	Sahar Ikram, Amina Rahim, Muhammad Afzal "PDLIM4 GENE POLYMORPHISM rs3900945 in OSTEOPOROTIC ELDERLY POPULATION". JPMA. Submitted	2023		X
27	Qayyum, S., Afzal, M. , Naveed, A. K., Butt, I. A., Sajjad, M., & Azam, M. (2023). Association of vascular endothelial growth factor a gene (VEGFA) polymorphisms, rs699947 and rs1570360, with diabetic retinopathy and altered VEGF secretion in the Pakistani patients with type 2 diabetes mellitus: a casecontrol study. <i>JPMA. The Journal of the Pakistan Medical Association</i> , 73(12), 2348–2356. https://doi.org/10.47391/JPMA.6072	2023	1.002	X
26	Maqsood J, Rahim A, Afzal M , Bajwa M, Karim B, Hashmi T. Association of nrf2 gene polymorphism with polycystic ovary syndrome —a case-control study. <i>PJP [Internet]</i> . 30Sep.2022 [cited 25Jan.2023];18(3):15-8. Available from: https://www.pjp.pps.org.pk/index.php/PJP/article/view/1467	2022	--	Y
25	Sadiq, M. A., Ahmed, S., Afzal, M. , & Tashfeen, S. (2022). A basis for prenatal diagnosis of Haemophilia-A in Pakistani patients. <i>Pakistan Journal of Medical Sciences</i> , 38(8). https://doi.org/10.12669/pjms.38.8.6524	2022	2.34	X
24	Afzal, M. , Naeem, M. A., Ahmed, S., Amin, N., Rahim, A., Munawar, M., Ishaq, M., Rathore, A., & Maria, K. (2022). Noninvasive prenatal testing of beta-thalassemia for common Pakistani mutations: a comparative study using cell-free fetal DNA from maternal plasma and chorionic villus	2022	2.269	X

	sampling. <i>Hematology</i> (Amsterdam, Netherlands), 27(1), 353–359. https://doi.org/10.1080/16078454.2022.2045052			
23	Trembley, J. H., Kren, B. T., Afzal, M. , Scaria, G. A., Klein, M. A., & Ahmed, K. (2022). Protein kinase CK2 - diverse roles in cancer cell biology and therapeutic promise. <i>Molecular and cellular biochemistry</i> , 1–28. Advance online publication. https://doi.org/10.1007/s11010-022-04558-2	2022	3.842	W
22	Aamir, M., Naveed, A. K., Afzal, M. , & Siddiq, A. (2022). Differential expression of cancer associated plasma miRNAs in the ordnance factory workers, exposed to 2,4,6-Trinitrotoluene. <i>Pakistan journal of medical sciences</i> , 38(3Part-I), 547–552. https://doi.org/10.12669/pjms.38.3.4928	2022	1.088	X
21	Karim, B., Rahim, A., Afzal, M. , Ashfaq, S., & Javed, M. (2022). Association of Fok 1 (Rs10735810) Gene Polymorphism with Dental Caries in Pakistani Adolescents. <i>PAFMJ (Pakistan Armed Forces Medical Journal)</i> , 72(1), 231-34. https://doi.org/10.51253/pafmj.v72i1.6181	2022	--	Y
20	Rehman, B., Rahim, A., Afzal, M. , Tazarrat, A., Kashif, H., & Qayyum, S. (2022). Association of Nrf2 gene polymorphism (rs6721961) with semen parameters in primary male infertility cases in Pakistani population. <i>PAFMJ</i> , 72(2), 398-402. https://doi.org/10.51253/pafmj.v72i2.7565	2022	--	Y
19	Qayyum, S., Afzal, M. , & Naveed, A. K. (2021). Association analysis of 374T/A (rs1800624) receptor for advanced glycation end-products (RAGE) gene polymorphism with diabetic retinopathy in Pakistani patients. <i>Pakistan journal of medical sciences</i> , 37(3), 733–739. https://doi.org/10.12669/pjms.37.3.3670	2021	1.088	X
18	Mahmood, A., Rahim, A., Afzal, M. , Bajwa, M. I., Zaman, Y., & Cheema, H. W. (2021). Association study of interleukin-1 receptor associated kinase 1 rs3027898 A/C gene polymorphism and preeclampsia in Pakistani population. <i>JPMA. The Journal of the Pakistan Medical Association</i> , 71(5), 1332–1336. https://doi.org/10.47391/JPMA.1307	2021	0.573	X
17	Qayyum, S., Afzal, M. , & Naveed, A. K. (2021). Association analysis of -429T/C receptor for advanced glycation end-products (RAGE) gene polymorphism with diabetic retinopathy and serum soluble RAGE levels in Pakistani patients. <i>Journal of the Pakistan Medical Association. Vol. 71 No. 4</i> , 1175 – 1180. https://doi.org/10.47391/JPMA.01-184	2021	0.573	X
16	Naeem MA, Amin N, Javed A, Khan M, Rathore A, Amir M, Mansoor I, Afzal M. Fetal RhD Genotyping using Cell-Free Fetal DNA from Maternal Plasma in RhD Negative Women in Pakistan. <i>International Journal on Obstetrics and Gynecology</i> . 2021;1(1):16–19. DOI: 10.51626/ijog.2021.01.00003.	2021	--	--
15	Afzal, M. , Kren, B. T., Naveed, A. K., Trembley, J. H., & Ahmed, K. (2020). Protein kinase CK2 impact on intracellular calcium homeostasis in prostate cancer. <i>Molecular and cellular biochemistry</i> , 470(1-2), 131–143. https://doi.org/10.1007/s11010-020-03752-4 .	2020	2.795	W
14	Kiyani, M. M., Rehman, H., Hussain, M. A., Jahan, S., Afzal, M. , Nawaz, I., Mahmood, T., & Bokhari, S. (2020). Inhibition of Hyperuricemia and Gouty Arthritis in BALB/c Mice Using Copper Oxide Nanoparticles. <i>Biological trace element research</i> , 193(2), 494–501. https://doi.org/10.1007/s12011-019-01734-2	2020	2.431	W
13	Jahan, S., Rahim, A., Afzal, M. , Naveed, A. K., Ayub, S., & Hasan, A. (2020). Association of single nucleotide polymorphism of transforming growth factor β1 (T29C) in breast cancer patients: a case control study in Rawalpindi. <i>JPMA</i> .	2020	0.642	X

	<i>The Journal of the Pakistan Medical Association</i> , 70(3), 390–393. https://doi.org/10.5455/JPMA.296490			
12	Bajwa, M. I., Rahim, A., Afzal, M. , & Mahmood, A. (2020). Glutathione S-Transferase Theta 1 / Mu 1 Null Genotype and Risk of Development of Actinic Keratosis in Pakistani Population. <i>Journal of the College of Physicians and Surgeons--Pakistan</i> : <i>JCPSP</i> , 30(6), 574–578. https://doi.org/10.29271/jcpsp.2020.06.574	2020	0.426	X
11	Jahan, S., Rahim, A., Afzal, M. , Naveed, A. K., Ayub, S., & Hasan, A. (2020). Response to Comments on Jahan et al (JPMA 70: 390-393; 2020) Association of single nucleotide polymorphism of transforming growth factor β 1 (T29C) in breast cancer patients: A case control study in Rawalpindi. <i>JPMA. The Journal of the Pakistan Medical Association</i> , 70(7), 1296. https://pubmed.ncbi.nlm.nih.gov/32799300/	2020	0.573	X
10	Rahim, A., Afzal, M. , Naveed, A. K., & Naeem, M. (2021). Association of miR-146a gene polymorphism and expression levels of its target protein RhoA in Pakistani breast cancer patients. <i>JPMA. The Journal of the Pakistan Medical Association</i> , 71(2(B)), 686–690. https://doi.org/10.47391/JPMA.825	2020	0.573	X
9	Ayub, S., Rahim, A., Afzal, M. , Jahan, S., Hasan, A., & Zainub, A. (2019). Comparison of asymmetric dimethylarginine levels between pre-and post-menopausal women - a cross-sectional study from Rawalpindi. <i>JPMA. The Journal of the Pakistan Medical Association</i> , 69(12), 1808–1811. https://doi.org/10.5455/JPMA.296507	2019	0.642	W
8	Hasan, A., Rahim, A., Afzal, M. , Naveed, A. K., Ayub, S., & Jahan, S. (2019). Serum Albumin and C3 Complement Levels in Endometriosis. <i>Journal of the College of Physicians and Surgeons--Pakistan : JCPSP</i> , 29(8), 702–705. https://doi.org/10.29271/jcpsp.2019.08.702	2019	0.407	W
7	Rahim, A., Afzal, M. , & Naveed, A. K. (2019). Genetic polymorphism of <i>miRNA-196a</i> and its target gene <i>annexin-A1</i> expression based on ethnicity in Pakistani female breast cancer patients. <i>Pakistan journal of medical sciences</i> , 35(6), 1598–1604. https://doi.org/10.12669/pjms.35.6.1322 .	2019	0.843	W
6	Wajahat Ullah Khan , Amena Rahim , Kenza Mobeen , Muhammad Afzal , Abdul Khaliq Naveed. 2019. Clinical Significance of Serum Adenosine Deaminase Levels in Breast Cancer Patients. <i>Journal of Islamic international Medical College..</i> 2019; 14(4): 188-191. https://journals.riphah.edu.pk/index.php/jiimc/article/view/1194	2019	--	Y
5	Atteaya Zaman , Amena Rahim , Muhammad Afzal , Abdul Khaliq Naveed. (2018) Cystatin C versus Creatinine as Early-Stage Diabetic Nephropathy Marker. <i>Journal of Islamic international Medical College.</i> 2018 Vol. 13, No.2. ISSN 1815-4018. https://journals.riphah.edu.pk/index.php/jiimc/article/view/1033	2018	--	Y
4	Zarrin Khaliq Chaudari , Amer Siddiq , Amena Rahim , Muhammad Afzal , Abdul Khaliq Naveed , Shagufta Saeed Sial. 2018. <i>Leptin Levels in Polycystic Ovarian Syndrome.</i> <i>Journal of Islamic international Medical College.</i> 2018 Vol. 13, No.1. ISSN 1815-4018. https://journals.riphah.edu.pk/index.php/jiimc/article/download/1025/593/3902	2018	--	Y
3	Rabbia Shabbir, Amena Rahim, Muhammad Afzal. (2018). Assessment of Serum Enzymatic Antioxidant Levels in Recurrent Aphthous Stomatitis Patients. <i>Journal of Islamic international Medical College.</i> 2018 Vol. 13, No.3. Print ISSN 1815-4018; Online ISSN 2410-5422. https://journals.riphah.edu.pk/index.php/jiimc/article/view/1044	2018	--	Y

2	Afzal M , Rahim A, Naveed AK, Ahmed S, Kiyani MM (2018) Development of Cost-effective Tetra-primer Amplification Refractory Mutation System (T-ARMS) PCR for the Detection of <i>miR-146a</i> gene rs2910164 C/G Polymorphism in Breast Cancer. <i>Biochemistry & Molecular Biology Journal</i> . Vol. 4:No. 1: 1. DOI:10.21767/2471-8084.100050	2018	0.36	--
1	Afzal, M. , Amir, M., Hassan, M. J., Hussain, M. S., Aziz, M. N., Murad, S., Murtaza, I., Anees, M., & Sultan, A. (2016). Clinical role of HER2 gene amplification and chromosome 17: a study on 154 IHC-equivocal cases of invasive breast carcinoma patients. <i>Tumour biology : the journal of the International Society for Oncodevelopmental Biology and Medicine</i> , 37(7), 8665–8672. https://doi.org/10.1007/s13277-015-4657-7	2016	3.650	W

Acknowledgments

1. Naeem MA. Establishing CRISPR-Cas Technology in Pakistan. *CRISPR J.* 2021 Aug;4(4):467-468. doi: 10.1089/crispr.2021.29132.nae. PMID: 34406048. (IF = 6.071)

References

Prof. Dr. Khalil Ahmed

Senior Research Career Scientist & Professor of Laboratory Medicine and Pathology
Member, Masonic Cancer Center, University of Minnesota, USA
Minneapolis, MN 55417, U.S.A.
Phone: (612)-467-2594; Fax: (612)-725-2093
E-mail: ahmedk@umn.edu
Websites: www.pathology.umn.edu
www.micab.org & www.cancer.umn.edu/index.html

Prof. Dr Shuaib Ahmed HI (M)

Professor of Hematology
Riphah International University, Islamabad
CEO, Genetics Resource Centre, Rawalpindi
Cell: +92 333 5623478
Email: suhaib955@hotmail.com

Prof. Dr. W. Thomas Shier

Professor, Department of Medicinal Chemistry
College of Pharmacy, University of Minnesota Institute of Medical Sciences, USA
Telephone #: (612) 624-9465
Fax #: (612) 624-0139
Email: shier001@umn.edu