# Moazzam Ali

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| **Current position:** | Assistant professor, Institute of Biochemistry and Biotechnology, University of the Punjab |
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## Academic Appointments

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| Assistant Professor | Institute of Biochemistry and Biotechnology, University of the Punjab Lahore, from 1 May 2012 to date. HEC approved PhD supervisor |
| Lecturer (regular) | Institute of Biochemistry and Biotechnology, University of the Punjab Lahore Pakistan, from 8 June 2004 to 30 April 2012 (on study leave from Jan 2008 to March 2012), work responsibilities included undergraduate and postgraduate teaching and supervision of M.Sc. research |
| Research Officer | Working on Higher Education Commission Pakistan funded research project "High-level synthesis of bovine somatotropin using different *Escherichia coli* expression systems" Institute of Biochemistry and Biotechnology, University of the Punjab Lahore, from 3 September 2003 to 8 June 2004. |

## Publications

**Moazzam Ali**, Zeeshan Mutahir and Anjum Riaz (2019). CRISPR/Cas9 engineering of ERK5 identifies its FAK/PYK2 dependent role in adhesion-mediated cell survival. Biochemical and Biophysical Research Communications. 513, 179-185 **IF 2.56**

Mahak Fatima, M. Mubasshar Iqbal Ahmed, Faiza Batool, Anjum Riaz, **Moazzam Ali**, Birgitte Munch-Petersen, Zeeshan Mutahir (2019). Recombinant deoxyribonucleoside kinase from Drosophila melanogaster can improve gemcitabine based combined gene/chemotherapy for targeting cancer cells. Bosnian Journal of Basic Medical Sciences. 19, 342-349 **IF 1.43**

Sumrin, A., Moazzam, S., Khan, A., Ramzan, I., Batool, Z., Kaleem, S., **Ali, M.**, Bashir, H., Bilal, M. (2018) Exosomes as Biomarker of Cancer. Brazilian Archives of Biology and Technology 61, e18160730 **IF 0.67**

Zeeshan, R., Mutahir, Z., Iqbal, H., **Ali, M**., . . . Rehman, I. (2018) Hydroxypropylmethyl cellulose (HPMC) crosslinked Chitosan (CH) based scaffolds containing Bioactive glass (BG) and Zinc oxide (ZnO) for Alveolar Bone Repair. Carbohydrate Polymers 193, 9-18 **IF 5.15**

Herman, E.K., **Ali, M.**, Field, M.C., and Dacks, J.B., (2018) 'Regulation of endocytosis across eukaryotes: Evolution and functional homology of Vps9 proteins.' Traffic 19, 546-563 **IF 4.40**

Iqbal, H., **Ali, M**., Zeeshan, R., Mutahir, Z., Iqbal, F., Nawaz, M. A. H., . . . Rehman, I.-u. (2017). Chitosan/hydroxyapatite (HA)/hydroxypropylmethyl cellulose (HPMC) spongy scaffolds-synthesis and evaluation as potential alveolar bone substitutes. Colloids and Surfaces B: Biointerfaces, 160 (Supplement C), 553-563. **IF 3.99**

**Ali, M**., Leung, K-F., and Field, M.C., (2014) 'The ancient Rab21 small GTPase functions in intermediate endocytic steps in trypanosomes.' Eukaryotic Cell 13 304-319 **IF 2.82**

**Ali, M** and Field, M.C., (2013) 'Cell density-dependent ectopic expression in bloodstream form *Trypanosoma brucei*.' Experimental Parasitology 134, 249-255 **IF 1.85**

## Education

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| 2008-2012 | **University of Cambridge, St Edmund's College**<br>Ph.D. "Mapping complexity of endocytic pathways in *Trypanosoma brucei*" see thesis abstract on last page of CV for details. |
| 2000-2002 | **University of the Punjab, Institute of Biochemistry and Biotechnology Lahore Pakistan**<br>M.Sc. in Biochemistry with distinction overall percentage of marks: 78% and CGPA 3.66/4<br>Dissertation "PCR amplification of ovine somatotropin gene and its partial characterization" |
| 1998-2000 | **Government College Lahore**, **Pakistan**<br>B.Sc. with distinction major subjects; Botany, Chemistry, Zoology, 826 /1000 marks, GPA 3.85/4 |
| 1996-1998 | **Government Islamia College Civil lines Lahore**<br>Intermediate Premedical, 821/1100 marks, grade **A** |

## Awards

Higher Education commission Pakistan: four year scholarship for study towards a PhD at the University of Cambridge

Higher Education commission Pakistan: MS leading to PhD scholarship for Germany (not availed)

**Projects as PI**

Higher Education Commission Pakistan (HEC), National research program for Universities (NRPU) Project Rs. 4,100,463 (2016-19)

Modulation of P-glycoprotein membrane trafficking to overcome multidrug resistance in cancer

University of the Punjab, Vice chancellor's provision for research Rs 500,000 (2015-16)

University of the Punjab Research projects Rs 150,000 each

1. Investigation of endocytic role of human small GTPase Rab28 (2012-13)
2. Role of Rab proteins in endosome maturation (2013-14)
3. Role of ESCRT complex in endosome maturation (2014-15)
4. Endocytic ability of multidrug resistant cancer cells (2015-16)

**Projects as Co PI**

HEC start up grant, Mechanism of integrin-induced ERK5 signalling Rs 500,000 (2014-15)

HEC start up grant, Role of drosophila melanogaster deoxyribonucleoside kinase (DmdNK) in cancer gene therapy Rs 385,000 (2014-15)

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**Conferences and Workshops Attended / Organized**

EMBO meeting 2015 Birmingham UK

Membrane trafficking UK annual symposium, London 2008 to 2011

Organizing secretary; workshop on 'biochemical engineering and fermenter applications' held at Institute of Biochemistry and Biotechnology, University of the Punjab 2006

Pre-18th FAOBMB symposium satellite workshop on Bioinformatics 2005

Presented a paper "PCR amplification of ovine somatotropin gene and its partial characterization" in 7th International conference of Pakistan society of biochemistry and molecular biology 2003

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**Key Research Skills**

Construction of RNAi and expression constructs
Quantitative real time PCR
Expression of recombinant proteins in animal cells
Fluorescent, confocal and electron microscopy
Transfection by electroporation
Site directed mutagenesis
Ectopic expression of proteins in eukaryotic systems
Working with class II pathogens
Animal cell culture
RNAi for knockdown studies
Physical interaction of proteins
Working with radionuclides

Flow cytometry
Phylogenetic analysis

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**Other interests**

I enjoy running, trekking and cooking

**Research students supervised**

Kiran Wilayat MSc Biochemistry session 2003-2005
PCR amplification and cDNA cloning of bovine somatotropin gene

Iffat Jehan MSc Biochemistry session 2003-2005
RT PCR amplification and molecular cloning of water buffalo thyrotropin alpha subunit gene

Abida Naseem MSc Biochemistry session 2003-2005
Hepatitis B virus geneotyping system corresponding to three major genotypes by polymerase chain reaction using type specific primers

Naveed Ashfaq MSc Biochemistry session 2003-2005
RT PCR amplification and cDNA cloning of water buffalo (Bubalus bubalis) thyrotropin beta subunit gene

Sana Gull MSc biochemistry session 2004-2006
RT PCR amplification and cDNA sequencing of chicken growth related genes

Sana Majeed MSc Biochemistry session 2004-2006
Somatotropin cDNA sequencing comparison between different breeds of chicken

Irum Gull MSc Biotechnology session 2005-2007
In vitro propagation and biochemical investigation of stevia rebaudiana at different stages of callus growth

Sidra Shoukat MSc Biotechnology session 2005-2007
DNA fingerprinting by three STR loci PCR amplification and silver stain detection

Shagufta saeed MSc (Hons) Biotechnology session 2005-2007
Diagnosis of streptococcus pneumonia by nested PCR amplification of autolysin gene fragment

Mumayyiza Tahir MS Biochemistry session 2011-2013
Characterization of small GTPase Rab28

M. Ibraheem M.Sc. Biochemistry session 2011-2013
Localization studies of human Rab28

Muhammad Ali BS Biotechnology session 2009-2013
Role of Rab proteins in endosome maturation

Tehreem Tahir BS Biochemistry session 2009-2013
Effect of TSG101 silencing on endocytic Rab proteins

Zeshan Majeed MS Biotechnology session 2012-2014

Role of Rab GTPases in p glycoprotein trafficking

Shehral Ahmad MS Biotechnology session 2012-2014
Role of Rab proteins in endosome maturation

Muhammad Ibraheem MS Biotechnology session 2013-15
Investigating endocytic pathways in multidrug resistant cancer cells

Adil Sultan BS Biotechnology session 2011-15
Expression modulation of endocytic proteins in drug resistant cancers cells

Mariam Naseem BS Biotechnology session 2011-15
Expression of drug transporters in multidrug resistant cancers

Anum Javed M. Sc. Biochemistry session 2014-16
Expression of Pak isoforms in drug resistant cancer cells

Khadija Rauf MS Biotechnology session 2014-16
Expression of pro and anti apoptotic proteins in epirubicin resistant cancer cells

Ayesha Imran MS Biotechnology session 2014-16
Role of Tsg101 in multi drug resistant cancer

Saba Idrees MS Biotechnology session 2014-16
Investigation of endocytosis in multi drug resistant cancer cells

Amna Mahmood MS Biotechnology session 2014-16
Role of Tsg101 and Rab21 in regulating late endosomes

Isma Umar MS Biotechnology session 2014-16
Role of Integrins in adhesion and migration of multi drug resistant cancer cells

Muhammad Zubair Aftab MS Biochemistry session 2015-17
Molecular basis of epirubicin resistance in PC3 and HCT-116 cancer cells

Faiza Inayat MS Biochemistry session 2015-17
Role of human Rab28 in chemoresistant cancer cell lines

Muhammad Imran MS Biochemistry session 2015-17
Role of micro RNA in epirubicin induced drug resistance in human cancer cells

Aqsa Saeed BS Biotechnology session session 2013-17
Development and characterisation of epirubicin resistant breast cancer cell lines

Umm-E-Rida BS Biotechnology session 2013-17
Development and characterisation of epirubicin resistant MCF7 cell line

Shanza Zafar MSc Biochemistry session 2016-18
Reversal of ABC efflux pumps mediated chemoresistance using natural alkaloid Cepharanthine

Samra Kanwal MSc Biotechnology session 2016-18
Reversal of anthracycline resistance in colon cancer cells using natural compound curcumin

Iqra Shahid BS Biochemistry session 2014-18
Quercetin mediated reversal of epirubicin resistance in colon cancer HCT-116 cells

Bint-e-Zainab BS Biochemistry session 2014-18
Chemo-sensitisation of multi drug resistant prostate cancer cells using curcumin

Hafiza Noor-ul-Ain BS Biotechnology session 2014-18
Reversal of anthracycline resistance in cancer cells using natural flavonoid Myricetin

Khadija Ikram BS Biotechnology session 2014-18
Chemo-sensitisation of drug resistant prostate cancer PC3 cells by natural flavonoid Quercetin

Mahak Bokhari MS Biochemistry session 2017-19
Role of Integrins and Rab GTPases in regulating adhesion and migration of anthracycline resistant prostate cancer cells

Maria MS Biochemistry session 2017-19
Chemo-sensitisation of multi drug resistant colon cancer cells using natural compounds

Faiza Ayub MS Biochemistry session 2017-19
Reversal of gemcitabine resistance in breast cancer cells using natural compounds

Hafsa Gulzar MS Biotechnology session 2017-19
Reversal of ABCG2 efflux pump mediated chemoresistance in breast cancer cells using natural flavonoids

Saleha Akhtar MS Biotechnology session 2017-19
Inhibition of ABCG2 efflux pump using natural compounds for chemo-sensitisation of drug resistant breast cancer cells

Rameen Imran BS Biochemistry session 20175-19
Role of MTH1 in epirubicin resistant colon cancer cells

Tanzeela Jamil MSc Biotechnology session 2017-19
Role of MTH1 in epirubicin resistant prostate cancer cells

**Research in progress**

Maryam Yousaf PhD Biochemistry session 2013-17
Membrane trafficking pathways of ABC transporters in multi drug resistant cancer cells

**References**

Mark C. Field
Professor of Cell Biology and Parasitology
Division of Biological Chemistry and Drug Discovery, University of Dundee,
Dow Street, Dundee, Scotland, DD1 5EH.
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Dr. Mahjabeen Saleem
Assistant Professor
Institute of Biochemistry and Biotechnology
University of the Punjab Lahore Pakistan
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**PhD Thesis abstract**

**Mapping complexity of endocytic pathways in *Trypanosoma brucei***

*Trypanosoma brucei*, a protozoan parasite, is the causative agent of human and animal trypanosomiasis in sub-Saharan Africa. It has also emerged as a model to study the evolution of eukaryotic endomembrane system due to its experimental accessibility and divergent evolutionary position. It also has one of the highest known rates of endocytosis that has a vital role in immune evasion and pathogenicity. Rab proteins constitute the largest family of the Ras GTPase superfamily, and have evolved as important regulators of membrane transport, providing efficient spatio-temporal control of transport between the interconnected network of endomembrane compartments. To further understand the complexity of endosomal pathways in *T. brucei* this dissertation explores the role of TbRab21 in coordinating the endocytic transport and the regulation of early endosomal Rab activation in *T. brucei*.

Mammalian Rab21 localises to early endosomal vesicles and the loss of functional Rab21 results in endocytic defects. Rab21 is specifically known for its role in traffic of integrins, with implications in embryogenesis and cancer progression. Rab proteins cycle between inactive and active GDP and GTP bound forms to perform their functions, which is regulated by the action of guanine nucleotide exchange factors (GEFs). Several of the GEFs that are specific for the Rab5 subfamily and control early endosomal dynamics have a conserved Vps9 domain.

Here I show that TbRab21 localizes to endosomes, partially colocalizing with both Rab5A and multivesicular bodies (MVB). TbRab21 expression is essential for cellular proliferation and its loss results in a block in traffic to the lysosome. Knockdown of TbRab21 had no effect on TbRab5A but did result in loss of MVB components, while knocking down the ESCRT component TbVps23 resulted in loss of Rab21. These data suggest that Rab21 is downstream of Rab5A, and mainly resides on the same structures as TbVps23. Of two *T. brucei* Vps9 proteins encoded by the genome, one is endosomal and partially colocalizes with TbRab5A and 21, whereas the other, which possesses MORN repeats as well as the Vps9 domain, is cytoplasmic. Individual knockdown of these Vps9 proteins results in a proliferative defect but no uptake defect, whereas double knock down results in a severe proliferative defect along with reduced uptake and loss of Rab5A and Rab21 from endosomes. The MORN Vps9 domain protein preferentially binds the GDP form of Rab5A. These results led to the hypothesis that TbRab21 functions downstream of Rab5A and plays a role in cargo movement from early to late endosomes, while the two TbVps9 domain proteins are essential for the membrane localization of Rab5A and 21 possibly acting as their guanine nucleotide exchange factors.