Dr. Zaigham Abbas

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BIOSKETCH

Dr. Zaigham Abbas is working as an Assistant Professor at Department of Microbiology and Molecular Genetics, University of the Punjab after completion of my PhD from University of Nottingham in 2011. During PhD he worked on the development of tools to target antigens through mannose receptor to develop vaccine against cancer. Antigen targeting through MR showed promising results to induce B cell and T cell immunity against melanoma in mice model. He supervised and currently supervising the thesis of Ph.D, MS/M.Phil, M.Sc and B.S research students covering different aspects. His research interests generally lie in cellular and molecular therapeutics. Some of his research students are working on the characterization of different aero-allergens and their clinical complications such asthma with future goals to advance into recombinant vaccines of allergy and development diagnostic devices against different local aero-allergens. Recently, he assessed the role stem cells derived conditioned media in diabetic mice wound healing and arthritic rats. Different physical, serological, histological and molecular parameters were checked to ensure the progression of the ailment and then the suppression of the disease using adipose derived stem cells conditioned media. The mice treated with ADSC-conditioned media showed significant wound closure as well as reduction in blood glucose levels of diabetic mice. Moreover ADSC-conditioned media reduce inflammation in arthritic rats. Dr Zaigham has taught the courses of Basic, Advanced Immunology, Monoclonal Antibodies, Cell and Molecular Biology at undergraduate and post graduate level.

EDUCATION

PhD In immunology, University of Nottingham (2007-2011)
Thesis Title: **Vaccine development through antigen targeting to mannose receptor.**
Supervisors: Dr. Luisa Martinez-Pomares and Prof. Dr. Lindy Durrant
B.Sc.(Hons.) in Microbiology and Molecular Genetics, University of the Punjab, Lahore (2002-2006)
Thesis title: **Seroprevalence and comparative screening of HBsAg in Pediatric patients.**

EMPLOYMENT

- **Assistant Professor** at **the Department of Microbiology and Molecular Genetics**, University of the Punjab Lahore. (05/01/2012 to date).
- **Lecturer** at **the Department of Microbiology and Molecular Genetics**, University of the Punjab Lahore. (29/05/07 to 04/01/12).
- Worked as **a Microbiologist** in the **MS Pharmaceutical industry** for four months (01/03/06 to 01/06).

DISTINCTION/AWARDS

- Higher Education Commission, Pakistan approved supervisor.
- Awarded overseas scholarship for PhD, Under Faculty development program by University of the Punjab, Lahore (2007-2010).
- Awarded MOL Research Funding from School of Molecular Medical Sciences University of Nottingham to prepare chimeric antibodies and to conduct antigen presentation assays *in-vitro* (2,500 £) (2008-2009).
- Recipient of Merit Scholarship awarded by Board of Intermediate & Secondary Education Multan.

PROFESSIONAL AFFILIATION

- Member European Academy of Allergy and Clinical Immunology (EAACI).
- Chief-coordinator of National Academy of Young Scientists. (www.nays.com.pk)

- Vice-president of the Sciforum (2005-2009).
- Member Young thinkers of Pakistan (YTP)

PROFESSIONAL TRAINING (WORKSHOPS/ CONFERENCES):

I attended/organized 37 national and international workshops conferences.

TEACHING EXPERIENCE

I taught following course at graduate and undergraduate level.

Class	University/ Department	Semester	Course No	Course Title	Period
MS/ M Phil	MMG	02 PhD	MMG-751-761	Immunological Techniques	2016,2017,2018
BS/ M Sc	MMG	07 BS & BS06	MMG-4709	Monoclonal Antibodies	2012, 2013, 2014,2015, 2016,2017,2018
	IBB	BS-07 Sem	IBB-412	Advanced Immunology	2016
	MMG	06 BS & 03 MSc	MMG-3605	Food Microbiology	2012, 2013, 2014,2015, 2016,2017,2018
	MMG	03 BS	MMG-204	Animal Biodiversity	2012
	MMG	03 BS		Tutorial	2012, 2013, 2014
	MMG	3rd	MMG-206	Cell Biology	2014,2015, 2016,2017,2018
	MMG	2nd	MMG-156	Microbial Diversity	2014
	MMG	04 MSc	MMG-4705	Bioethics	2013

RESEARCH PROJECT GRANTS

External Research Grants

1. **Title:** Isolation, Purification and Characterization of Novel Peptides from common aero-allergens encountered in Pakistan **Funding Agency:** Higher Education Commission, Pakistan**. Funding amount: 40,23,608 Rupees, 2017 (PI)**
2. **Title:** Preparation of immune-chromatographic device for early diagnosis of Dengue virus infection. **Funding Agency:** Higher Education Commission, Pakistan (2012-2013) **Funding amount:** 5, 00,000 Rupees.
3. **Title:** Potential role of staphylococcal penicillin binding protein (PBP) in cross reactivity with murine cytokine assay. **Funding Agency:** Higher Education Commission, Pakistan**. Funding amount: 452,000 Rupees, 2017 (Co-PI)**
4. **Title:** Isolation and Characterization of Bacteriphages against the Multidrug resistant bacterial pathogens to be used for phage therapy. **Funding Agency:** Higher Education Commission, Pakistan**. Funding amount: 68,13,922 Rupees, 2016 (Co-PI).**

Indigenous Institutional Research Grants

I won 8 indigenous institutional research grants.

RESEARCH THESIS SUPERVISED

I supervised 12 MS/Mphil and 17 BS and MSc thesis.

PUBLICATIONS:

1. Muhammad Shahbaz Aslam, Iram Gull, Malik Siddique Mahmood, Muhammad Mudassir Iqbal, Zaigham Abbas, Imran Tipu, Aftab Ahmed & Muhammad Amin Athar (2019): High yield expression, characterization, and biological activity of IFNα2-Tα1 fusion protein, Preparative Biochemistry & Biotechnology, DOI: 10.1080/10826068.2019.1689509. **(1.117).**
2. Ayesha Farooq, Muhammad Imran, Amna Farooq, Shoomaila Latif, Muhammad Liaqat, Zaigham Abbas, Gabriel Bratu and Liviu Mitu, 2019. ANTIBACTERIAL ACTIVITY STUDIES OF Co(II), Ni(II), Cu(II) AND Zn(II) COMPLEXES WITH MANNICH BASE LIGAND. Bull. Chem. Soc. Ethiop. 2019, 33(3), 485-492. ISSN 1011-3924. **(0.765).**
3. K. Zahra, S. Rehman, N. Javed, M. S. Aslam and Z. Abbas*, 2019. Extract preparation of major food allergens of pakistan and their protein profiling. The Journal of Animal & Plant Sciences, 29(1): 2019, Page: 91-98. **0.407**
4. Madiha Habib, Shehar Bano, Shafiq -ur Rehman, Naveed Shahzad, Nauman Javeed, Muhammad Shahbaz Aslam, and Zaigham Abbas*, 2019. Hepatoprotective Role of Swimming Against Arsenic Induced Oxidative Stress In Mice. Journal of King Saud University-Science.
5. Abid Hussain, Farida Ahmed, Shyamali C Dharmage, Shafiq ur Rehman and Zaigham Abbas*, 2019. Aero and Food Allergens Sensitization Patterns in a Clinic-Based Sample in Pakistan: A One Year Retrospective Study. Pakistan Journal of Zoology. 0.547
6. I. Gull, A. Noreen, M. S. Aslam, Z. Abbas* and M. A. Athar, 2019. Effect of Gelling Matrix Composition, Storage Conditions and Capsule Breakage on Germination of Rosa Indica Synthetic Seeds. The Journal of Animal & Plant Sciences, 29(1): 2019, Page: 109-116. **0.407**
7. Tabassum R, Shafique M, Khawaja K A, Alvi I A, Rehman Y, Sheik, Abbas Z, S U Rehman. Complete genome analysis of a Siphoviridae phage TSK1 showing biofilm removal potential against Klebsiella pneumoniae. 2018. Scientific Reports. 8 (1):1-8. 10.1038/s41598-018-36229-y. **4.122**
8. Alvi I A, Asif M, Tabassum R, Abbas Z and S U Rehman. Storage of bacteriophages at 4°C leads to no loss in their titer after one year. 2018. Pakistan Journal of Zoology. 50 (6): 2395-2398. **0.547**
9. Zaigham Abbas and Sakina Rehman (September 19th 2018). An Overview of Cancer Treatment Modalities, Neoplasm Hafiz Naveed Shahzad, IntechOpen, DOI: 10.5772/intechopen.76558. Available from: https://www.intechopen.com/books/neoplasm/an-overview-of-cancer-treatment-modalities. (Book Chapter)
10. Muhammad Shahbaz Aslam, Iram Gull1, Zaigham Abbas, and Muhammad Amin Athar, 2018. Soluble Expression of IFNα2-Tα1 Fusion Protein in Escherichia coli by N-terminal SUMO Fusion and its Anti-Proliferative Activity Pakistan Journal of Zoology. 50(4), 1413-1419 **(IF 0.547)**.
11. Muhammad Shahbaz Aslam , Abeera Shaeer, Zaigham Abbas, Aftab Ahmed, Iram Gull, and Muhammad Amin Athar, 2017. Cell-Free DNA Quantification and Methylation Status of DCC Gene as Predictive Diagnostic Biomarkers of Lung Cancer in Patients Reported at Gulab Devi Chest Hospital, Lahore. Technology in Cancer Research & Treatment 16(6) 758–765 **(2.185 IF).**
12. Maliha Uroos, Zaigham Abbas, Shumaila Sattar, Nigarish Umer, Arham Shabbir, Shafiq-ur-Rehman, and Ahsan Sharif, 2017. Nyctanthes arbor-tristis Ameliorated FCA-Induced Experimental Arthritis: A Comparative Study among Different Extracts. Evidence-Based Complementary and Alternative Medicine. 2017. 1-13 **(1.931 IF)**.
13. Madiha Hashmi, Abid Hussain, Shafiq ur Rehman, Farida Ahmed, Shahbaz Aslam, Nadeem Afzal and Zaigham Abbas, 2017. Negative Association of HLA-DRB1*11 and HLA-DRB1*12 Alleles with Aeroallergy Patients Visiting Allergy Centre (NIH), Islamabad, Pakistan. Pakistan Journal of Zoology. 49 (5), pp 1563-1569. **(IF 0.547)**
14. Muhammad Mansoor, Zaigham Abbas and Nageen Husssain, 2017. Effect of Gluten Containing Diet on Pristane Induced Lupus Prone Mice. Pakistan Journal of Zoology 49(4), pp 1285-1292. **(IF 0.547)**
15. Shafique M, Alvi IA, Abbas Z, Rehman SU, 2017. Assessment of biofilm removal capacity of a broad host range bacteriophage JHP against Pseudomonas aeruginosa. APMIS; 125: 579–584 **(1.795)**.

16. Tahir, A., M. Asif, Z. Abbas, and S U Rehman. 2017 Three Bacteriophages SA, SA2 and SNAF can Control Growth of Milk Isolated Staphylococcal Species. Pakistan Journal of Zoology. 49.2:493-496. **(IF 0.547)**
17. Aftab Ahmad, Sadia Ashraf, Zaigham Abbas, 2016. Current Status of Research and Development in the SAARC region, Science Technology and Development 35 (2): 63-66.
18. S. U Rehman, M. Rauf, Z. Abbas, M.H. Hamid and I. Qadri. 2016. Role of Some Predominant Host immuno-modulators SNPs in Severity of HBV and HCV infection. Viral Immunology. 29, 10: 1-10. **(1.513).**
19. Khawaja, K. A., Z. Abbas, and S. U. Rehman. 2016. Isolation and characterization of lytic phagesTSE1-3 against *Enterobacter cloacae*. Open Life sciences. 11:287-292. **(0.814)**
20. M. S. Aslam, K. Hanif, S. U. Rehman, I. Gull, M. A. Athar and Z. Abbas. 2016. Delignification of Paper Pulp by Purified Laccase from Aspergillus Flavus. The Journal of animal and plants sciences. 29. 5:1399-1404. **(0.422)**
21. Mehdi, R., A. Hussain, M. Ahsan, S. U. Rehman, M. S. Aslam, and Z. Abbas. 2016. Cloning and Expression of p40 Gene Isolated from Probiotic Bacteria of Dairy Origin. Pakistan Jouranl of Zoology 48:1769-1774. **(IF 0.547)**
22. Numan Javed, Zaigham Abbas, Romeeza Tahir and Nadeem Afzal, 2016. Isolates of Staphylococcus aureus Induce Selected Metabolites in Human Polymorpho nuclear Leucocytes. Pkaistan Journal of Zoology. Volume 48(5): 1563-1565. **(IF 0.547)**
23. Sehar Yousaf, Abid Hussain, Shafiq Ur Rehman, Muhammad Shahbaz Aslam and Zaigham Abbas, 2016. Hypoglycemic and hypolipidemic effects of Lactobacillus fermentum, fruit extracts of Syzygium cumini and Momordica charantia on diabetes induced mice. Pakistan Journal of Pharmaceutical sciences. 29(5): 1535-1540 **(0.682).**
24. Abid Hussain, Muhammad Sohail, Zaigham Abbas, 2016. Prevalence of Enterococcus faecalis mediated UTI and its current antimicrobial susceptibility pattern in Lahore. Journal of the Pakistan Medical Association. Volume 66(10): 1232-1236. **(0.414).**
25. Khawaja, K. A., M. Rauf, Z. Abbas, and S. U. Rehman. 2016. A virulent phage JHP against Pseudomonas aeruginosa showed infectivity against multiple genera. Journal of basic 56: 1090-1097 **(1.823).**
26. Yousaf, B., Amina, G. Liu, R. Wang, A. Qadir, M. U. Ali, Q. Kanwal, B. Munir, Asmatullah, and Z. Abbas. 2016. "Bisphenol a Exposure and Healing Effects of Adiantum Capillus-Veneris L. Plant Extract (Ape) in Bisphenol a-Induced Reproductive Toxicity in Albino Rats." Environ Sci Pollut Res Int, 23(12): 11645-11657. **(2.83).**
27. Hamza, A., S. Perveen, Z. Abbas, and S. U. Rehman. 2016. The Lytic SA Phage Demonstrate Bactericidal Activity against Mastitis Causing Staphylococcus aureus. Open Life Sciences 11:39-45 **(0.782).**
28. Zainab, B. Z. Abbas. And S. U. Rehman. 2016. A Phage P.E1, Isolated from Hospital Sewage Reduces the Growth of Escherichia coli. Biocontrol Science and Technology 26: (2), 181-188 **(0.938).**
29. Hussain A, Mumtaz HM, Aslam MS, Abbas Z (2015). Seroprevalence of transfusion based transmissible infections among clinically healthy donors in the community of Multan, Pakistan. J. Inf. Mol. Biol. 3(2): 47-51.
30. Muhammad Shahbaz Aslam, Tanveer Khalid, Iram gull, Zaigham Abbas, Muhammad Amin Athar (2015). Identification of Major Allergens of Paper Mulberry (Broussonetia Papyrifera) Pollens and Purification of Novel 40 kDa Allergen Protein. Current Allergy and clinical immunology, 28 (1): 36-41.
31. Hafiz Ghulam Murtaza Saleem, Usman Aftab, Imran Sajid, Zaigham Abbas and Anjum Nasim Sabri (2015). Effect of crude extracts of selected actinomycetes on biofilm formation of A. schindleri, M. aci, and B. cereus. Journal of Basic Microbiology 54(12): 645-651 **(1.823).**
32. Muhammad Shahbaz Aslam*, Sidra Naveed, Aftab Ahmed, Zaigham Abbas, Iram Gull, Muhammad Amin Athar (2104). Side Effects of Chemotherapy in Cancer Patients and Evaluation of Patients Opinion about Starvation Based Differential Chemotherapy. Journal of Cancer Therapy, 5: 817-822.

33. A. Hussain, S. U. Rehman, S. Aslam*, N. Javed and Z. Abbas (2014). Development of device based on nano-gold particles to detect NS1; an early diagnostic marker of Dengue virus infection. Journal of animal and plant Sciences, 24 (4): 1110-1115. **(Impact factor = 0.659)**.
34. Co-author of the conference paper, "N Javed, Z Abbas, 2013. Ability of different isolates of staphylococcus aureus to induce selected metabolites in human polymorphonuclear leucocytes" presented in 14th International Congress on Antiphospholipid Antibodies & 4th Latin American Congress on Autoimmunity APLA & LACA during 18-21 September 2013, Rio de Janerio, and Brazil.
35. Zaigham Abbas, Basharat Ali and Anjum Naseem Sabri, (2012). Antimicrobial Activity of Biocides against Different Microorganisms Isolated from Biodeteriorated Paints. Journal of Zoology, 44 (2): 576-579 **(IF 0.547)** (Short communications).
36. Munnaza Kiran, Shazia Afrasayab, Zaigham Abbas*, Muhammad Faisal and Shahida Hasnain (2012). Plant growth promoting capability of Azotobacter as mono and mix culture on Vigna radiate. African Journal of Microbiology Research, 6 (6): 1291-1296 **(Impact factor = 0.533)**.
37. EMARA, M., ROYER, P. J., ABBAS, Z., SEWELL, H. F., MOHAMED, G. G., SINGH, S., PEEL, S., FOX, J., SHAKIB, F., MARTINEZ-POMARES, L. & GHAEMMAGHAMI, A. M. (2011) Recognition of the major cat allergen Fel d 1 through the cysteine-rich domain of the mannose receptor determines its allergenicity. J Biol Chem, 286, 13033-40. **(Impact factor = 5.36).**
38. ABBAS, Z., JAFFERY, G. AND ANWAR, M.S. (2008) Seroprevalence and compararative screening of HBsAg in pediatric patients. *Journal of Zoology*, **40:** 105-108. **(IF 0.547)**

Appendix

A- Summary of PhD project:

Dendritic cells (DC) are unique antigen presenting cells which play a major role in antigen presentation and initiation of the immune response by regulating B- and T- cell activation. Antigen targeting to DC receptors is an effective, safe and specific method for vaccine development. The mannose receptor (MR) is an endocytic receptor expressed by subpopulations of DC and antigen targeting through MR leads to enhanced antigen uptake and presentation to T-cells. This makes MR a favourite receptor for the development of vaccines against diseases that require T-cell immunity such as cancer and viral infections. This project sought to develop tools to target antigens through MR and investigate their ability to induce T-cells activation in vitro and in vivo.

We have used four approaches to deliver antigen through MR ; (i) MR-specific mAbs: 5D3 and 6C3, have been chemically linked to the melanoma epitope TRP-2, (ii) MR-specific chimeric antibodies carrying several model antigens have been generated by using genetic engineering and (iii) Glycopolymers and the suitable antigens such as a shorter version of model antigen ovalbumin (OVA), with and without N-glycosylation sites have been generated and characterised. Glycopolymer-OVA conjugates were prepared by chemical coupling but it requires further optimization. The binding efficiency of anti-MR antibodies has been assessed using ELISA and BIACORE and the glycopolymers have been tested for their interaction with MR. Immunisations were performed with anti-MR mAb-TRP2 conjugates which induced TRP-2 specific CD8+ T-cells activation and improved humoral response. Due to limitations in this approach in terms of chemical coupling being an inefficient method and the potential involvement of Fc recetors (FcRs), chimeric Abs fused to model antigens and bearing mutated Fc were generated. These chimeric Abs, have been tested for their ability to induce T-cell activation in vitro and in vivo.

During my PhD I developed four different approaches to deliver cancerous antigens to DCs through Mannose Receptor and my Phd thesis also comprised of four chapters which are briefly discussed below.

(i) Generation of chimeric anti-MR Ab by genetic engineering

The present chapter describes the generation of chimeric anti-MR mAb (5D3-HEL) bearing a mutated Fc portion of mouse IgG1 and a hen egg lysozyme (HEL) derived epitope. Plasmid constructs carrying anti-DEC205 Ab-HEL

fused to a mutated Fc region of mouse IgG1 (Clynes et al., 2000), kindly provided by Prof Nussenzweig (Rockefeller University, New York) were used as starting materials. Binding properties of the anti-MR mAbs 5D3 and 6C3 were compared using BIACORE. The variable regions; VH and VL of 5D3 were cloned and used to replace the variable region of DEC205-HEL to obtain 5D3-HEL. This chapter also describes expression of DEC205-HEL, 5D3-HEL and the control protein IgG1-HEL, and their initial characterisation in terms of their binding to DEC205 and MR respectively.

(ii) Investigation of the capacity of chimeric anti-MR Ab to target Ag to antigen presenting cells and induceT-cell immunity

In vitro Ag presentation assays using HEL and OVA as model antigens were set up in this study. Novel reagents such as 5D3-HEL (chapter 3) and 5D3-OVA (this chapter) have been generated from DEC205-HEL and the potential of these antigen delivery reagents to activate T-cells was assessed, in vitro using these assays. DNA plasmids encoding 5D3-OVA and IgG1-OVA have been used to immunise animals to test their potential to generate OVA-specific T-cells.

(iii) Antibody-mediated targeting of TRP-2 Ag through MR to induce T-cell immunity

In this study, MR specific mAb (5D3 and 6C3) and isotype control IgG2a (Martinez-Pomares et al., 2003) have been conjugated covalently with TRP-2, a MHC-I restricted melanoma Ag. Binding of antibodies to MR before and after conjugation have been analysed by ELISA in order to assess the effect of chemical coupling on the binding, moreover MR-mediated internalization have also been assessed by using CHO cells expressing MR. TRP-2 conjugates were injected subcutaneously into mice in the presence of MPLA and CpG as adjuvants. After two booster doses mice were sacrificed and spleens were collected and TRP-2 specific T-cells secreting IFN were counted by ELISPOT.

(iv) Use of Glycopolymers for Antigen Targeting to dendritic cells potentially through MR

This study is a part of a wider project which has the ultimate goal to develop an Ag delivery system and vaccine against cancer. In this study functionalisable ('clickable') polymers were prepared by Atom transfer radical polymerisation (ATRP) starting from an initiator which presented a reactive unit able to react selectively with free cystein protein sulphidryl units. The polymer alkyne repeating units were then clicked with different sugar azides in different relative concentration to generate a library of glycopolymers with different relative amount of sugar units. Binding of different glycopolymers to MR and MR-mediated endocytosis was analysed. In future, glycopolymers will be conjugated with recombinant OVA mini-protein: a protein of molecular weight of 15 kDa and 136 aminoacid residues containing major CD4+ and CD8+ epitopes. Glyco-conjugates will be tested for their potential to induce T-cell-immunity.