

## **DR. SAIF ULLAH AFRIDI**

**(Assistant Professor & HEC-Approved Supervisor)**

Centre for Advanced Drug Research (CADR), Department of Pharmacy,  
COMSATS Institute of Information Technology (CIIT), Abbottabad-22060, Pakistan.

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### **Objectives**

To embark my career as a university professor and to establish a dynamic research group with a focus on; Drug Discovery, Immune system regulation, vaccines development, cancer and related immune pathological conditions.

### **Academic Qualification**

- PhD (Molecular Medicine), January 2016, Panjwani Centre for Molecular Medicine and Drug Research, International Centre for Chemical and Biological Science (PCMD, ICCBS), University of Karachi, Pakistan. Achieved distinction in course work for PhD (**cGPA 3.9**)
- M.Phil (Molecular Medicine), October 2011, (PCMD, ICCBS), University of Karachi, Pakistan.
- M. Sc (Biochemistry), 2007, University of Peshawar, Peshawar, Pakistan. (1<sup>st</sup> Division)
- B. Sc (Chemistry, Botany, Zoology), 2004, University of Peshawar, Pakistan. (1<sup>st</sup> Division)
- B. Ed (Biological Sciences, Physical Sciences), 2009 University of Peshawar, Pakistan.
- HSC (Pre-Medical) in 2002 from BISE Peshawar, Pakistan. (1<sup>st</sup> Division)
- SSC (Science) in 2000 from BISE Peshawar, Pakistan. (1<sup>st</sup> Division)

### **Honor/Awards**

1. Became HEC Approved Supervisor on April 03, 2017.
2. Nominated by COMSATS for **HEC Best Research Paper Awards 2015/2016**.
3. Nominated by COMSATS for **HEC Best Young Researcher Awards 2015/2016**.
4. Win 5 Years PCMD, ICCBS Scholarship Awards for M. Phil/PhD Studies 2008-2013.
5. Secure 2<sup>nd</sup> Position in Molecular Medicine GRE type Examinations-2010 with **89% percentile**.
6. Secure 1<sup>st</sup> Collègue Position in B.Sc Examinations-2004.
7. Always enlisted in top3 students.

### **Research Expertise**

- Cloning
- Expression
- ELISA assay
- DELFIA assay
- Flow Cytometry
- cDNA synthesis
- Hem agglutination
- Isolation of Neutrophils
- Immuno-histochemistry
- Polymerase Chain Reaction
- Ion Exchange Chromatography
- Primers designing and validations
- Well trained in Cell Culture by German Professor(*Worked on these 17 cell-lines*) →

1. 15310-LN
2. 2B4
3. 3A9N49
4. CH27
5. CTLL-2
6. DO11
7. EvHA/X5
8. HO104
9. Jurkat E6-1
10. L243
11. L57.23
12. L929
13. LB3.1
14. NIH-3T3
15. SF21
16. SF9
17. TOKUNAGA

- Gel Filtration Chromatography
- Immuno affinity Chromatography
- DNA / Protein Gel Electrophoresis
- DNA Point mutation and sequencing
- Antibodies production and purification
- Animal License holder (ICCBS-2015) for *In Vivo* study

## Scientific Contributions

### A. Editorial Board Member

1. *American Journal of Clinical and Experimental Medicine*

(<http://www.sciencepublishinggroup.com/journal/editorialboard?journalid=254>)

2. *Immune System and Disorders Journal*

(<http://www.alliedacademies.org/immune-system-and-disorders-journal/editors.php>)

### B. Publications (Total Impact factor: **34.704**)

1. **Afridi S**, Shaheen F, Roetzschke O, Shah ZA, Abbas SC, Siraj R, Makhmoor T. A cyclic peptide accelerates the loading of peptide antigens in major histocompatibility complex class II molecules. *Biochemical and Biophysical Research Communications*. 456, (2015) 774-779. **(I.F=2.466)**
2. **Afridi S\***, Hoessli DC, Hameed MW. Mechanistic understanding and significance of small peptide interaction with MHC class II molecules for therapeutic applications. *Immunological Reviews*. 272, (2016) 151-168. **(I.F=10.12)**
3. Khan B, Ahmed D, Rabnawaz M, Shah MR, Anis I, **Afridi S**, Makhmoor T, Tahir MN. Synthesis, and Cu<sup>2+</sup> triggered selective fluorescence quenching of Bis-calix[4]arene tetra-triazole macrocycle. *Journal of Hazardous Materials*. 309, (2016) 97-106. **( I.F= 6.065)**
4. Rasheed W, Shah MR, Kazmi MH, **Afridi S**. Sterically stabilized fluorescent Silver Nanoconjugates for optical discrimination of Cu (II) in real samples and in-vitro bioimaging of Cu(II) scavenging process in Human lymphocytes by Atomic Force Microscopy. *New Journal of Chemistry*. 40, (2016) 5546-5554. **(I.F= 3. 277)**
5. Anwar A, Shah MR, Ahmed SP, **Afridi S**, Khan K. Thia-pyridinium capped silver nanoparticles based supramolecular recognition of Cu(I) in real samples and T-lymphocytes. *New Journal of Chemistry*. 40, (2016) 6480-6486. **(I.F= 3.277)**
6. Attaullah M, Yousuf MJ, **Afridi S**, Dad I. Cell free DNA – a novel biomarker in the field of oncology; a comparative account in the cancer patients and healthy residents of Karachi city. *International Journal of Biosciences*. 9 (4), (2016) 356-364.
7. Shah MS, Khan SU, Ejaz SA, **Afridi S**, Rizvi SUF, Najam-ul-Haq M, Iqbal J. Cholinesterases inhibition and molecular modeling studies of piperidyl-thienyl and 2-pyrazoline derivatives of

chalcones. *Biochemical and Biophysical Research Communications*. 482, (2017) 615–624. **(I.F=2.466)**

8. **Afridi S\***, Azizullah. Individual immune system responds differently. *Immune System and Disorders Journal*. 1(1), (2017) 1-8.
9. Iqbal J, Anwar F, **Afridi S\***. Targeted Drug Delivery Systems and its Therapeutic Applications in Cancer and related Immune Pathological Conditions. *Infectious Disorders-Drug Targets*. 17 (3), (2017) 149–159. **(I.F= 0.82)**
10. Azizullah, Nisar-ur-Rehmana, Haider A, Kortz U, **Afridi S**, Sohail M, Joshi SA, Iqbal J. Novel pH responsive supramolecular hydrogels of chitosan hydrochloride and polyoxometalate: In-vitro, in-vivo and preliminary safety evaluation. *International Journal of Pharmaceutics*. 533, (2017) 125–137. **(I.F= 3.649)**
11. Dad I, Yousuf MJ, Attaullah M, **Afridi S.**, Ishtiaq AS, Rana, H, Ahmad, N, Amin, M, Tahir, M, Javed AM. A comparative toxic effect of Cedrus deodara oil on larval protein contents and its behavioral effect on larvae of mealworm beetle (*Tenebrio molitor*) (Coleoptera: Tenebrionidae). *Saudi Journal of Biological Sciences*. (In Press, corrected proof. 2017). **(I.F= 2.564)**

### C. Submitted Publications

1. **Afridi S\***, Adnan M., Khalil AW., Iqbal Z., Hoessli DC, Shahid M , Khan SU, Iqbal J Small molecules accelerate the expansion of Regulatory T cells by targeting the TCR. (Submitted to *Science Translational Medicine*. Ms.No. aao7152, on Friday, August 18, 2017). **( I.F=16.796)**
2. Furtmannb N, Bajorath J, Irum H, **Afridi S**, Iqbal J\*. Identification of new chromenone derivatives as cholinesterase inhibitors and molecular docking studies. (Submitted to *Chemical Biology & Drug Design*. Ms. ID: CBDD-RA-08-17-3851 on 09-Aug-2017). **(I.F=2.40)**
3. Saeed A, Rahman SU, Fattah TA, Channar PA, Larik FA, **Afridi S**, Iqbal J\*. Synthesis and Bio-evaluation of 15-LOX and CA-II Dual Inhibitors (E)-N-(substituted-benzylidene)-5-(1-(4-isobutylphenyl) ethyl)-1, 3, 4-thiadiazol-2-amines. (Submitted to *Bioorganic Chemistry*. Ms. ID: BIOORG\_2017\_110, on March 21, 2017). **(I.F=2.25)**

### D. Approved Research Projects

1. Project No. 21-1111/SRGP/R&D/HEC/2016. *Identification and characterization of regulatory T cell stimulatory molecules for their immune therapeutic applications*. Approved from SRGP-Program of HEC, Pakistan on August 22, 2016. **(Amount Approved = 0.43 million)**

### E. Research Projects Completed (Principal Investigator)

1. Project No. 21-1111/SRGP/R&D/HEC/2016. *Identification and characterization of regulatory T cell stimulatory molecules for their immune therapeutic applications*. Date of completion April 04, 2017.
2. PhD Thesis Research Project No. 20-1441/R&D/09. “*Identification and Characterization of Major Histocompatibility Complexes-Peptide Loading Enhancers for Development of Vaccines*”. Date of completion April 10, 2015. **(Role: PhD research Fellow)**

## F. Submitted Research Projects

3. Evaluation of Regulatory T cells (Treg) proliferatory activities of compounds isolated from medicinal plants and synthetic origin. Submitted to CIIT-Research Program of COMSATS, Pakistan on June 29, 2016. (Amount requested = 0.2 million), **(Role: P. I.)**
4. Determination of Noninvasive Biomarkers for Liver Fibrosis. Submitted to COMSTECH-TWAS, Pakistan on July 21, 2016. (Amount requested = 15 million), **(Role: P. I.)**
5. Synthesis of anthraquinone derivatives and their enzyme inhibition studies. Submitted to CIIT-Research Program of COMSATS, Pakistan on April 24, 2017. (Amount requested = 0.2 million), **(Role: Co-P. I.)**

## G. Scientific Work presentation (Oral Presentation)

1. New MHC-Peptide Loading Enhancers Identification and Characterization from Diverse Chemical Nature for Stimulation of Immune Responses. 7<sup>th</sup> Annual Health Research Conference. [From Therapeutics to Prevention: The Way Forward](#), April 29 to May 1, 2016. Organized by Khyber Medical University Pakistan.
2. Identification and Characterization of New MHC-Peptide Loading Enhancers from Diverse Chemical Nature for Development of Vaccines. 13<sup>th</sup> Biennial Conference on “[Recent Advances & Challenges in Molecular Biology, Biochemistry and Biotechnology](#)”. August 25-27, 2016. Organized by Centre for Advanced Drug Research, COMSATS Institute of Information Technology, Abbottabad-22060 Pakistan.
3. Abstract for oral talk in “[3<sup>rd</sup> World Congress on Infectious Diseases](#)” scheduled on August 21 - 23, 2017 at San Francisco, California, USA is also accepted.

## H. Posters presented in International Symposia

1. Identification and Characterization of New Classes of MHC-Peptide Loading Enhancers for Stimulation of Immune Responses. *Saifullah Afridi*<sup>1\*</sup>, *Rizwana Siraj*<sup>1</sup>, *Che Puteh Binti Usman*<sup>2</sup>, *Syed Comail Abbas*<sup>3</sup>, *Ahsan Ali*<sup>3</sup>, *Nor Hadiani*<sup>2</sup>, *Farzana Shaheen*<sup>3</sup>, *M. Raza Shah*<sup>3</sup>, *Olaf Roetzschke*<sup>4</sup>, and *Talat Makhmoor*<sup>1</sup>. [5<sup>th</sup> International Symposium-Cum-Training Course on molecular Medicine and Drug Research, Jan.12-15, 2015](#). Organized by Dr. Panjwani Centre for Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan.
2. Small Molecules as Peptide-Loading Enhancers onto HLA-DR to Stimulate Specific-Immune Responses. *Saifullah Afridi*<sup>1\*</sup>, *Rizwana Siraj*<sup>1</sup>, *Anum Gul*<sup>1</sup>, *Talat Makhmoor*<sup>1</sup> and *Olaf Roetzschke*<sup>2</sup>. [4<sup>th</sup> International Symposium-Cum-Training Course on molecular Medicine and Drug Research, Jan.07-10, 2013](#). Organized by Dr. Panjwani Centre for Medicine and Drug

Research International Centre for Chemical and Biological Science University of Karachi Pakistan.

3. Acceleration of Peptide-Loading onto HLA-DR1 by Small Molecules to Stimulate Immune Responses. *Talat Makhmoo, Saifullah Afridi and Rizwana Siraj. 4<sup>th</sup> International Symposium-Cum-Training Course on molecular Medicine and Drug Research, Jan.07-10, 2013.* Organized by Dr. Panjwani Centre for Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan.
4. Identification of Small Molecules as Peptide-Loading Enhancers onto MHC II Proteins to Stimulate Specific-Immune Responses. *Saifullah Afridi,<sup>1\*</sup> Rizwana Siraj, Anum Gul, Talat Makhmoo and Olaf Roetzschke. 2<sup>nd</sup> International Workshop on Dairy Science Park November 18-20, 2013.* Organized by University of Agriculture Peshawar Pakistan.

## I. Participation in Workshops and Symposia

1. [2<sup>nd</sup> International Symposium-Cum-Training Course on molecular Medicine and Drug Research, Jan.12-15, 2009.](#) Organized by Dr. Panjwani Centre for Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan.
2. The whole [lectures series on survey of Mass Spectrometry](#) Prof. Dr. David Smith March 2-26, 2009.
3. [First Nation-Wide Patch Clamp Workshop](#) November 6-12, 2008. Organized by Dr. Panjwani Centre for Medicine and Drug Research International Centre for Chemical and Biological Sciences University of Karachi Pakistan.
4. Workshop on “[An Introduction to Sample Collection](#)” April 27-28, 2009. Organized by Dow University of Health Sciences Karachi Pakistan.
5. [12<sup>th</sup> International Symposium on Natural Product Chemistry](#), September 22-25, 2010. Organized by HEJ Research Institute for Chemistry, International Centre for Chemical and Biological Science University of Karachi Pakistan.
6. [3<sup>rd</sup> International Symposium-Cum-Training Course on molecular Medicine and Drug Research, Jan.03-06, 2011.](#) Organized by Dr. Panjwani Centre for Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan.
7. [13<sup>th</sup> International Symposium on Natural Product Chemistry](#), September 22-25, 2012. Organized by HEJ Research Institute for Chemistry, International Centre for Chemical and Biological Science University of Karachi Pakistan.
8. [4<sup>th</sup> International Symposium-Cum-Training Course on molecular Medicine and Drug Research, Jan.07-10, 2013.](#) Organized by Dr. Panjwani Centre for Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan.
9. [Cell Culture Training](#) Course by Prof. Dr. med. Dieter Meyer March 04-22, 2013. Organized by Dr. Panjwani Centre for Medicine and Drug Research International Centre for Chemical and Biological Sciences University of Karachi Pakistan.
10. [2<sup>nd</sup> International Workshop on Dairy Science Park](#) November 18-20, 2013. Organized by University of Agriculture Peshawar Pakistan.
11. [5<sup>th</sup> International Symposium-Cum-Training Course on molecular Medicine and Drug Research, Jan.12-15, 2015.](#) Organized by Dr. Panjwani Centre for Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan.

12. [VEPP Workshop on Intellectual Property Rights and Entrepreneurship in Pakistan](#) October 05, 2015. Jointly, organized by International Centre for Chemical and Biological Science University of Karachi, in collaboration with the Federation of Pakistan Chambers of Commerce & Industry.
13. [4<sup>th</sup> Pak-France Bi-national Workshop on Drug Discovery and Molecular Medicine](#) October 12-14, 2015. Organized by Dr. Panjwani Centre for Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan.
14. [Healthy Heart Healthy Life: A New Era of Our Generation](#). December 30-31, 2015. Organized by Dow University of Health Sciences Karachi Pakistan.
15. [7<sup>th</sup> Annual Health Research Conference. From Therapeutics to Prevention: The Way Forward](#), April 29 to May 1, 2016. Organized by Khyber Medical University Pakistan.
16. [13<sup>th</sup> Biennial Conference on “Recent Advances & Challenges in Molecular Biology, Biochemistry and Biotechnology”](#) August 25-27, 2016. Organized by Centre for Advanced Drug Research, COMSATS Institute of Information Technology, Abbottabad-22060 Pakistan.
17. [1<sup>st</sup> Biennial Conference on “New Horizons in Drug Discovery and Pharmaceutical Sciences”](#) December 15, 2016. Organized by Department of Pharmaceutical Sciences Abbottabad University of Science and Technology, Pakistan.

## **J. Research Experience**

1. Assistant Professor at Centre for Advanced Drug Research (CADR), COMSATS Institute of Information Technology (CIIT), Abbottabad, Abbottabad-22060, Pakistan. From May 2016 to date.
2. Eight years research experience as a research fellow in the ISO certified cellular and molecular Immunology laboratory. Did Cellular & Molecular laboratory experiments and interpret the results. Maintain accurate laboratory records and data as an ISO student representative.
3. As a key solver (I.D = **saif\_afridi3311**) for *Nature InnoCentive Challenge* projects (<https://www.innocentive.com/ar/workspace/challenges>).
4. As a Technical Expert for *Promega & related Products* at the head office of *Molecular Products Co.* (MPC) University Road Karachi-74800, Pakistan. Phone: 021-34922501, 34922502, Email: [techserv@mpco.pk](mailto:techserv@mpco.pk)

## **K. Teaching Experience**

1. Assistant Professor at Centre for Advanced Drug Research (CADR), COMSATS Institute of Information Technology (CIIT), Abbottabad, Abbottabad-22060, Pakistan. From **May 16, 2016 to date**.
2. Molecular Medicine GRE Instructor (in Biochemistry) for M.Phil. Students from **Jun 2013-August 2013**. Organized by Dr. Panjwani Centre for Molecular Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan.
3. As a Science Teacher for **2.5 years (Dec 2005-July 2008)** at Matric level students in Frontier Corp Public School and Osmania Model High School at Pre-PhD Teaching level.

## L. Teaching based MS/PhD Student satisfaction

1. MS class entitled; *Spectroscopic Analysis of Pharmaceuticals* (3 credit hours). Passing rate was 100 % with student feedback satisfaction **94.8% (4.74/5)**. Fall 2016
2. MS class entitled; *Drug Development and Molecular Targets* (3 credit hours). Passing rate was 100 % with student feedback satisfaction **94.8% (4.74/5)**. Spring 2017

## References

- **Prof. Jamshed Iqbal** (Email: [jamshediqb@googlemail.com](mailto:jamshediqb@googlemail.com))  
(Head, Centre for Advanced Drug Research (CADR), COMSATS Institute of Information Technology, Abbottabad-22060 Pakistan)
- **Prof. Daniel C. Hoessli** (Email: [danielhoessli@gmail.com](mailto:danielhoessli@gmail.com))  
(Adjunct Professor at PCMD: Panjwani Centre for Molecular Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan)
- **Prof. Kaneez Fatima-Shad** (Email: [ftmshad@gmail.com](mailto:ftmshad@gmail.com))  
(Professor at UTS: University of Technology, Sydney, Australia)
- **Dr. Asmat Salim** (Email: [salimasmal@yahoo.com](mailto:salimasmal@yahoo.com))  
(Associate Professor at PCMD: Panjwani Centre for Molecular Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan)
- **Dr. Talat Makhmoor** (Email: [talatmakhmoor@hotmail.com](mailto:talatmakhmoor@hotmail.com))  
*Research supervisor* (Assistant Professor at PCMD: Panjwani Centre for Molecular Medicine and Drug Research International Centre for Chemical and Biological Science University of Karachi Pakistan)

## Personal Information

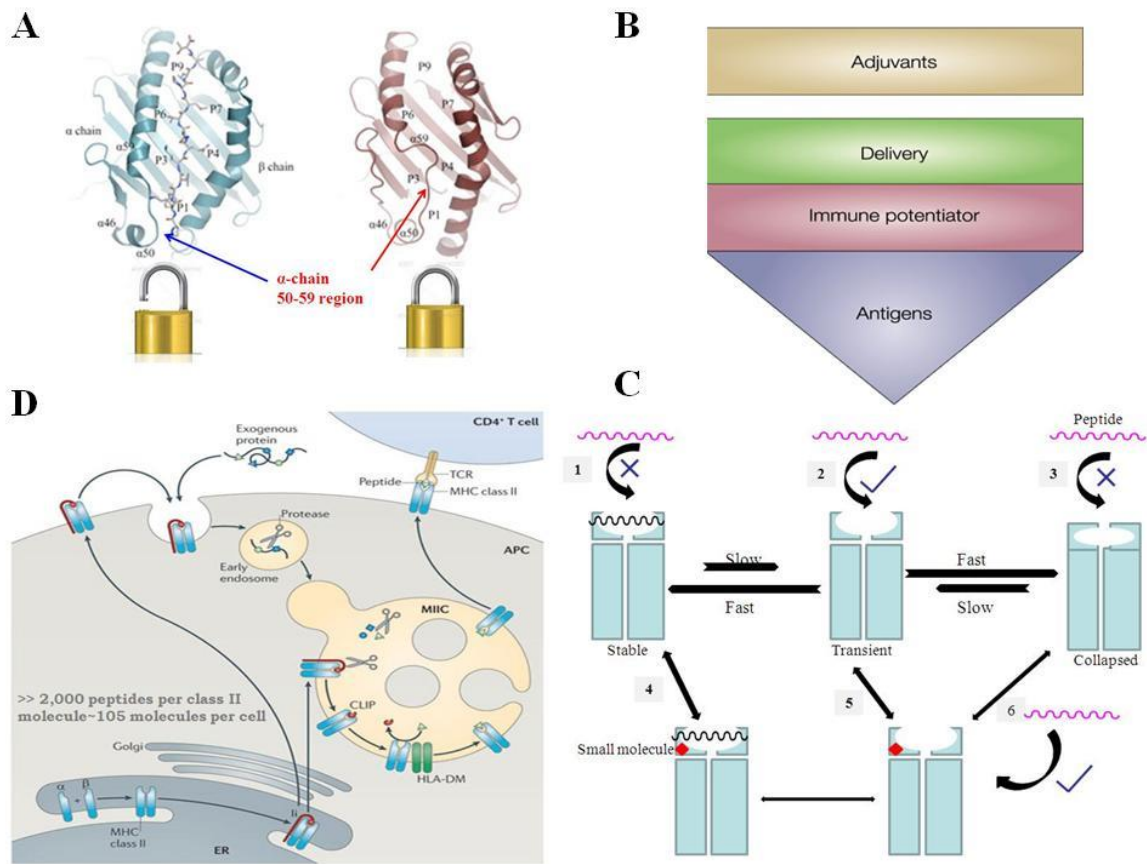
Passport No. : BS2740361  
Date of Birth : May 04, 1983  
Nationality : Pakistani

## Cover Letter

During my PhD research-work the following key aspect of immunology were investigated entitled; “*Identification and Characterization of Major Histocompatibility Complexes (MHC) Peptide Loading Enhancers for Development of Vaccines*”

**Abstract:** Since, T-cells don't recognize antigen until presented by MHC molecules as MHC: antigen-peptide complex, this MHC-peptide complex is crucial to elicit specific cells mediated immune responses. However, most of the MHC molecules are present in their non-receptive conformation [A]. It has been reported that certain small molecule such as MHC Peptide Loading Enhancers (MLEs) can amplify immune responses by catalyzing the peptide-loading onto MHC class II molecules; by making them available in their receptive conformation [C]. In continuation of searching effective peptide-loading enhancers, we had identified various small molecules as potent (MLEs) from the screening of a library of  $\geq 1300$  molecules [B]. To accomplish the objectives, we first set-up for primary screening of the library based on DELFIA assay by; i) Expressing the two alleles of MHC class II molecules, HLA-DR1 and DR2, as soluble protein using Sf21 insect cells; ii) Expressing the antigenic peptide HA<sub>306-318</sub> (Hem agglutinin from human influenza virus) in *E.coli* expression system and; iii) producing monoclonal antibodies, anti-HLA-DR, L243 and LB3.1 using respective hybridomas. Additionally, to identify the small molecules' interactions with MHC molecules, various mutants of HLA-DR1 were also generated by site-directed mutagenesis. Furthermore, these active hits were evaluated at the cellular level through FACS assay using EBV transformed B cells (APC). Meanwhile, specific CD4<sup>+</sup> T cell response followed by cytotoxic T cell (CTLL-2) activation was done by measuring the IL-2 release via HA<sub>306-318</sub>-restricted CD4<sup>+</sup> T (EvHA/X5) cells and BrdU incorporation in activated CTLL-2 cells. Similarly, the hits (MLEs) were proceeded toward their cytotoxicity assay (MTT / PI staining) using NIH-3T3 and APC cells. Finally, ADME properties were determined using *StarDrop* software. In therapeutic settings these molecules can be utilized as molecular tools to enhance immune response by stimulating efficient antigen loading on APC which directly translates into better T cell activation [D]. Thus the stimulation of specific-immune responses via MLEs molecules may offer them as effective adjuvant in vaccine development for the treatment of tumors or other relevant immune-pathological conditions.





I am interested to continue my scientific contributions in the same field and would like to study the key features playing active role in the regulation of immune system to overcome various immune pathological conditions during my research carrier. Furthermore, I am also interested to investigate the role of antigen specific T-cells activation in specific immune response.