Shafiq ur Rehman (PhD)

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Bio-Sketch

With a background knowledge in the field of microbiology and molecular genetics, in my BS degree coupled with doctoral research in the area of human viruses gave me a strong foundation to develop a pioneer research group of Pakistan working in the area of bacterial viruses. Completing my doctoral degree from University of Nottingham, UK in 2012 and working with human hepatitis C virus, I started working with bacteriophages for their potential use as alternative to antibiotics and now established lot of techniques in my lab. During this period, I became successful to secure funding of worth 650 million PKR from the international and national funding organizations. Currently my lab is focusing on characterizing natural bacteriophages, engineering field bacterial strains for their use as vaccines, engineering bacteriophages for enhanced properties, and characterizing bacteriophage proteins for their antibacterial potential. At the moment, my lab has trained 2 post-docs, 5 PhD students, multiple master and undergraduate students. I have established links with different industries and clinicians for translation of the innovations developed at my lab. Currently, multiple innovations are in the process of obtaining intellectual property rights. I am very satisfied my achievements and want to expand my expertise in a well-developed organization for working on real-human issues which can be translated for betterment of humanity.

ACADEMIC QUALIFICATION

- **PhD, Virology,** (Sep-2007 to Feb-2012), University of Nottingham, Nottingham, UK

Thesis Title: The nature and consequences of the hepatitis C Virus E1E2 envelope gene variability

- **Bachelor of Science, Microbiology and Molecular Genetics** (2002-2006), University of the Punjab, Lahore Paksitan.
- **Certificate:** Agri Innovation: From Development to Scale. Feb-2022. Awarded by Wellspring (40 National Hours).

EMPLOYMENT HISTORY

- **Professor (Tenured)**, Institute of Microbiology and Molecular Genetics, University of the Punjab, Lahore (27-November 2024 till date)
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- **Associate Professor (Tenured)**, Institute of Microbiology and Molecular Genetics, University of the Punjab, Lahore (25-August 2020 till 26-November-2024)
  Teaching virology, medical virology, molecular virology at undergraduate to doctoral level along with supervising the students and research staff on different research projects. Along with teaching and research I am also involved in curriculum design, controlling Dengue virus at the institute and member university international ranking committee.
- **Assistant Professor on TTS**, Department of Microbiology and Molecular Genetics, University of the Punjab, Lahore (16-April 2012 to 24-August 2020)
  Teaching virology, medical virology, molecular virology at undergraduate to doctoral level along with supervising the students and research staff on different research projects.
- **Lecturer,** Department of Microbiology and Molecular Genetics, University of the Punjab, Lahore (29 May, 2007 to 15 April 2012)

SECURED RESEARCH FUNDING

- Title: Efficacy and Safety studies of attenuated recombinant Vaccine against Salmonella Gallinarum for Pakistan Poultry production. Funding Agency: Higher Education Commission of Pakistan under TDF-22 call. Funding Amount **PKR 13859,000** (2025-2026) (collaborative research project between Grand Pharma Pakistan and University of the Punjab)-**Principal Investigator-In Progress**
- Title: Reducing antibiotic resistance through the commercialization and adoption of non-antibiotic methods to control bacterial infections in Pakistani poultry production. Funding Agency: International Development Research Centre (IDRC) Canada. Funding Amount CA$1600,000 equivalent to **PKR 120 Million** (2024-2026) (collaborative research project between Purdue University US, University of Sargodha and Punjab University Lahore)-**PU Project Manager-In-Progress**
- Title: Development of Bacteriophage Biobank against major pathogenic bacteria of poultry, and poultry borne human pathogenic bacteria. Funding Agency: Pakistan Science Foundation. **Funding Amount: 4226064 PKR, 2022-25 (CO-PI). In-Progress**
- Title: Biological control of mastitis using bacteriophage cocktails prepared in stem cells conditioned media: bio control potential and field trials. **Funding Agency:** Punjab Agricultural Research Board. **Funding Amount: 23846000 PKR, 2022-25 (Team Member). In-Progress**
- **Title**: Isolation and Characterization of Bacteriophages against Multi-Drug-Resistant Mycobacterium tuberculosis. **Funding Agency:** Higher Education Commission, Pakistan**. Funding amount: 7042200 PRK, 2022-2025 (Co-PI). In-Progress**
- **Title**: Development and commercialization of antibiotics alternatives for Pakistani Poultry production. Funding Agency: International Development Research Centre (IDRC) Canada. **Funding Amount**

CA$2,804,100 (2019-2023) PU Share is equivalent to **PKR 120 million** (collaborative research project between Purdue University US, UVAS Lahore and Punjab University Lahore)-PU Project Manager-**Completed successfully**

- **Title:** Isolation, Purification and Characterization of Novel Peptides from Common Aero-allergens encountered in Pakistan and their Association with Immuno-genetic Factors of Allergy Patients. **Funding Agency:** Higher Education Commission, Pakistan**. Funding amount: 4300450 PRK, 2017-2020 (Co-PI). -Completed successfully**
- **Title:** Isolation and Characterization of Bacteriophages against the Multidrug resistant bacterial pathogens to be used for phage therapy. **Funding Agency:** Higher Education Commission, Pakistan**. Funding amount: 68,13,922 PRK, 2016-2019 (PI). -Completed successfully**

PATENTS

Submitted

- Paul Ebner**, Shafiq ur Rehman** and Zafar Hayat**.** Antibiotic-Free Treatment for *Salmonella* Gallinarum in Poultry using Encapsulated Poly-Bacteriophage Therapy. Submitted to US patent Office in year 2023 PCT/US23/85171.
- Paul Ebner, Abdul Hanan, Zafar Hayat, and **Shafiq ur Rehman.** Antibiotic-Free Treatment for Avian Pathogenic *E. Coli* using Encapsulated Poly-Bacteriophage Therapy. Submitted in year 2024 in US patent office. Application Number 63530660
- Purdue research foundation, **Shafiq ur Rehman** and Zafar Hayat. Bacteriophages and use thereof for the treatment or prevention of infection caused by Salmonella Gallinarum. Submitted to Intellectual Property Office (IPO) Pakistan with application number 2302168361 on 22-12-2023.

In-Preparation

- Shafiq ur Rehman and Hafsa Tahir. Lytic Bacteriophages and use thereof for the treatment or prevention of Salmonella in chickens.
- Shafiq ur Rehman, Zulqarnain haider and Hafsa Tahir. Lytic Bacteriophages and use thereof for the treatment or prevention of infection caused by Clostridium perfringens in Poultry.
- Shafiq ur Rehman and Hafsa Tahir. Recombinant Bacteriophages and use thereof for the better treatment or prevention of infection caused by salmonella gallinarum.
- Shafiq ur Rehman, Hafsa Nasim, Zulqurnain Haider, Asad Asalm. Sal-MMG, a live attenuated vaccine for prevention of chicken Salmonellosis.

RESEARCH EVALUATION

- Evaluated several projects for Paksitan Science Foundations
- Evaluated several projects for National Institute of Health Paksitan for their 2022 call.
- Evaluated research projects for British Society for Antimicrobial Chemotherapy for their Covid-19 Grant Call-2019 and 2020
- Reviewed research articles for famous research journals in the area of Microbiology and Virology

RESEARCH TECHNIQUES WITH HANDS ON EXPERIENCE

- Aerobic and anaerobic culturing
- Isolation and characterization of bacteriophages against aerobic and anaerobic bacteria
- Mammalian cell culture
- General and real-time PCR, RT-PCR, Site directed Mutagenesis
- NGS sequence assembly, annotation, and genome Analysis
- Cloning, expression and protein purification
- Genome editing through different modern ways (CRISPR, Golden Gate, Gibson, NEB-Assembly Master-mix)
- Animal Experiments (Mice rats and chickens)
- ELSIA
- Western blotting
- Pseudoviral particle production
- Designing and making live attenuated poultry vaccine
- Bacteriophage genome engineering.

CONFERENCES ORGANIZED

- Dr. Shafiq ur Rehman organized two days workshop, Workshop on Isolation and Characterization of Bacteriophages for Phage Therapy" at the University of the Punjab on 17-18 March 2023
- Dr Shafiq ur Rehman organized three days international conference, "MMG-2018-A conference on Microbiology and Molecular Genetics" at the University of the Punjab, in collaborations with Department of Allied Health Sciences, The Superior College Lahore, on 7-9 Feb 2018.
- Dr Shafiq ur Rehman organized two days workshop, "Advances in Phage therapy" at Department of Microbiology, Hazara University, Mansehra in Collaboration with department of Microbiology and Molecular Genetics, University of the Punjab, on 4-5 Apr 2017.
- Dr Shafiq ur Rehman organized one day pre conference workshop, "isolation and propagation of bacteriophages" at Abbottabad University of Science and technology Hawalian on 19 Dec 2016.

- Dr. Shafiq ur Rehman organized 4 days 10th Biennial International Conference of Pakistan Society for Microbiology, Exploring Microbes for Future Endeavors organized by MMG department in collaboration with IBA and ORIC, University of the Punjab Lahore and American Society for Microbiology held at the University of the Punjab, Lahore on 25-28 March, 2015.
- Dr Shafiq ur Rehman organized the conference titled: Bio-physiochemical basis for the Technopreneurship organized by the Dept. of Microbiology and Molecular Genetics and Institute of Business Administration, university of the Punjab on 2-3 April 2013.

STUDENTS SUPERVISED

Sr. No.	Student's Name	Class	Thesis Title	Year
1	Iqbal Ahmed Alvi	Post-Doc	In research Project, "Development and commercialization of antibiotics alternatives for Pakistani Poultry production" (Finished)	2022-2023
2	Basit Ali	Post-Doc	In research Project, "Development and commercialization of antibiotics alternatives for Pakistani Poultry production" (Finished)	2019-2021
3	Hafsa Naseem	PhD	Sal-MMG as live attenuated vaccine candidate for control of Salmonellosis in poultry (In Progress)	2024-2029
4	Zainab Yasir	PhD	Developing Bacteriophage-Derived Endolysins to control difficult to treat bacterial Pathogens	2023-2027
5	Noor Aqsa	PhD	Isolation, characterization, and antibacterial potential of Bacteriophages against Multi-drug resistant gram-negative bacteria	2022-2026
6	Muhammad Zulqarnain	PhD	Development of CRISPR-Cas9 mediated vaccine candidate by knocking out virulent genes in Avian pathogenic *Escherichia coli* (In Progress)	2021-2025
7	Muhammad Ahsan Shafiq	PhD	Assessment of Recombinant Bacteriophage Lytic Proteins against Multi-Drug Resistant Bacteria (In Progress)	2020-2024
8	Kanza Batool	PhD	Isolation and characterization of Bacteriophages against Hospital Acquired Extended Spectrum Beta-Lactamases (ESBL) producing *Escherichia Coli* (Thesis submitted)	2018-2023
9	Ayesha Munir	PhD	Assessment of Bacteriophages to Control Poultry Origin Non-typhoidal Salmonella species (Completed)	2018-2023
10	Muhammad Asif	PhD	Assessing the Potential of Engineered Bacteriophage Based Lytic Enzymes and Membrane Permeabilizers to Tackle the Outer Membrane Barrier of Multi-Drug Resistant Gram-Negative Bacteria (Completed)	2017-2023

11	Rabia Tabbasum	PhD	Assessment of bacteriophages as therapeutic agent against multiple drug resistant pathogenic bacteria (Completed)	2016-2023
12	Iqbal Ahmed Alvi	PhD	To assess the efficacy of bacteriophages against the antibiotic resistant Pseudomonas *auroginosa* (Completed)	2015-2019

MS/Mphil students Supervised **27**
BS Students Supervised **25**

PUBLICATIONS

- **Publications with first author or corresponding author**

1. Genomic and Physiochemical characterization of two Lysogenic bacteriophages ΦCP5(17) and ΦCP17(i) against Clostridium perfringens. 2025. Accepted in Archives of Virology
2. Ullah Z, I. A. Alvi, Z. Niaz, I. Ullah, A. Ullah, and S. U. Rehman. 2024. Reducing Multidrug-Resistant (MDR) Klebsiella pneumoniae via the Efficient Use of Bacteriophages ZI3 and HI3. Current Trends in OMICS. 4.1. https://doi.org/10.32350/cto.41.02.
3. Munir A, Ilyas SZ, Tahir H, Basit A, Haider Z, Rehman SU. 2023. PCR based early detection and antibiotic resistance pattern of Salmonella Gallinarum isolates from Pakistan poultry. J Microbiol Methods. 2023:106709.
4. Asif, M., I. A. Alvi, M. Waqas, A. Basit, F. A. Raza and S. U. Rehman .2023. "A K-17 serotype specific Klebsiella phage JKP2 with biofilm reduction potential." Virus Res 329: 199107.
5. Hamza Tahir, Abdul Basit, Hafsa Tariq, Zulquernain Haider, Asim Ullah, Zafar Hayat, and Shafiq Ur Rehman. 2022. Coupling CRISPR/Cas9 and Lambda Red Recombineering System for Genome Editing of Salmonella Gallinarum and the Effect of ssaU Knock-Out Mutant on the Virulence of Bacteria. Biomedicines. 10: 12: 3028. https://doi.org/10.3390/biomedicines10123028.
6. 2. Rabia Tabassum, abdul basit, Muhammad Asif, Iqbal Ahmed Alvi, Shafiq Ur Rehman.2022. TSP, a virulent Podovirus, can control the growth of Staphylococcus aureus for 12 hours. Scientific Reports.12:10008. https://doi.org/10.1038/s41598-022-13584-5
7. Abdul Basit, Tahir H, Haider Z, Tariq H, Ullah A and Rehman S U. 2022. CRISPR/Cas9 based deletion of SpvB gene from Salmonella Gallinarum leads to loss of virulence in chicken. Frontiers in Bioengineering and Biotechnology. 10. 885227. https://doi.org/10.3389/fbioe.2022.885227.
8. Syeda Z.I, Tariq H, Basit A,Tahir H, Haider Z, and Rehman S. U. 2022. SGP-C: A broad host range Temperate Bacteriophage; against Salmonella Gallinarum. Frontiers in Microbiology. https://doi.org/10.3389/fmicb.2021.768931
9. Zulquern H, Ali T, Ullah A, Basit A, Tahir H, Tariq H, Ilyas S Z, Hayat Z, Rehman S U. 2022. Isolation, toxinotyping and antimicrobial susceptibility testing of *Clostridium perfringens* isolated from Pakistan poultry. Anaerobe. 73(2022): 1-7. https://doi.org/10.1016/j.anaerobe.2021.102499
10. Basit A, Karim AM, Asif M, Ali T, Lee JH, Jeon JH, Rehman Su, Lee SH. 2021. Designing Short Peptides to Block the Interaction of SARS-CoV-2 and Human ACE2 for COVID-19 Therapeutics. Frontiers in Pharmacology., **12**(2310). https://doi.org/10.3389/fphar.2021.731828
11. Asif M, Hafsa N, Iqbal A. A., Abdul B and Rehman S. U. 2021. Characterization of a lytic EBP bacteriophage with large size genome against Enterobacter cloacae. APMIS. 129 (8) 461-469. **https://doi.org/10.1111/apm.13138** .

12. Basit A, Qadir S, Qureshi S and Rehman S U. 2021. Cloning and expression analysis of fused holin-endolysin from RL bacteriophage; Exhibits broad activity against multi drug resistant pathogens. Enzyme and Microbial Technology. 149 (2021) 109846, 1-9. *https://www.sciencedirect.com/science/article/pii/S0141022921001046*.

13. Ali. T.; Basit, A.; Karim, A.M.; Lee, J.-H.; Jeon, J.-H.; Rehman, S.u.; Lee, S.-H. 2021. Mutation-Based Antibiotic Resistance Mechanism in Methicillin-Resistant Staphylococcus aureus Clinical Isolates. Pharmaceuticals 2021, 14,(5), 420, 1-11. https://doi.org/10.3390/ph14050420

14. Alvi. I. A., M. Asif and Rehman S. U. 2021. A Single dose of a virulent bacteriophage vB PaeP-SaPL, rescues bacteremic mice infected with multi drug resistant *Pseudomonas aeruginosa*. Virus Research. Vol 292. https://www.sciencedirect.com/science/article/pii/S0168170220311576.

15. Basit A, Ali T, Rehman S.U. 2020. Truncated human angiotensin converting enzyme 2; a potential inhibitor of SARS-CoV-2 spike glycoprotein and potent COVID-19 therapeutic agent. Journal of biomolecular structure & dynamics 2020:1-10. https://doi.org/10.1080/07391102.2020.1768150.

16. Iqbal A. A., M. Asif., R. Tabassum., R. Aslam., Z. Abbas., and Rehman S.U. 2020. RLP, a bacteriophage of the family Podoviridae, rescues mice from bacteremia caused by multi-drug resistant Pseudomonas aeruginosa. Archives of Virology. **165**:1289–1297 https://doi.org/10.1007/s00705-020-04601-x .

17. Asif M., I. A. Alvi., R. Tabassum, and Rehman. S.U. 2020. TAC1, an Un-classified Myoviridae Bacteriophage against Acinetobacter baumannii with High Burst Size and Short Latent Period. Archives of Virology. 165 (2): 419-424 https://doi.org/10.1007/s00705-019-04483-8

18. 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. https://doi.org/10.1038/s41598-018-36229-y.

19. 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. http://dx.doi.org/10.17582/journal.pjz/2018.50.6.sc8

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21. Muafia Shafique, Iqbal Ahmad Alvi, Zaigham Abbas and **Shafiq ur Rehman**. 2017. Assessment of Biofilm Removal Capacity of a Broad Host Range Bacteriophage JHP against *Pseudomonas aeruginosa.* **APMIS.** 125. 579-584. **https://doi.org/10.1111/apm.12691 2.8.**

22. 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. http://dx.doi.org/10.17582/journal.pjz/2017.49.2.529.533

23. 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. https://doi.org/10.1515/biol-2016-0038 **.**

24. **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: 536-545. https://doi.org/10.1089/vim.2016.0062

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27. 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. https://doi.org/10.1080/09583157.2015.1086311

28. **Rehman S U**, Jamil. N. and Hassain. S**.** 2007. Screening of different contaminated environments for polyhydroxyalkanoates-producing bacterial strains. Biologia **62:**650-656. https://doi.org/10.2478/s11756-007-0144-y

29. **Rehman S U**, Jamil. N. and Hassain. S. 2006. Characterization and Optimization of antibiotic resistant bacterial strains for polyhydroxyalkanoates. Pakistan Journal of Agricultural Research **19:**81-86. https://www.academia.edu/28616616/characterization_and_optimization_of_antibiotic_resistant_Bacterial_strains_for_polyhydroxyalkanoates_PHAS_production?from_sitemaps=true&version=2

- **Publications as co-author**

1. Farah Khan, Hafsa Naseem, Muhammad Asif, Iqbal Alvi, **Shafiq ur Rehman** and Abdul Rehman. Bacteriophages RCF and 1-6bf can control the growth of avian pathogenic Escherichia coli. Poultry Science. 2025. 1-9. https://doi.org/10.1016/j.psj.2025.104790
2. Adeela Fatima, Muhammad Abbas, Shahid Nawaz, Yasir Rehman, **Shafiq ur Rehman** and Imran Sajid. Whole genome sequencing (WGS) and genome mining of Streptomyces sp. AFD10 for antibiotics and bioactive secondary metabolites biosynthetic gene clusters (BGCs). Gene Reports. 2024. 37: 1-9. https://doi.org/10.1016/j.genrep.2024.102050.
3. Kinza Saleem, Zafar Hayat, Hira Latif, Zara Tariq, Tuba Riaz, Sana Ullah, Shama Jamil, **Shafiq ur Rehman**, Muhammad Azam. 2024.Growth Performance and Gut Microbiota of Broilers Administered Different Levels of Mango Seed Kernel Extract. Brazilian Journal of Poultry Science. 2024:26(2): 1-8. http://dx.doi.org/10.1590/1806-9061-2023-1843.
4. Tuba Riaz, Zafar Hayat, Kinza Saleem, Kashif Akram, Hafeez Ur Rehman, **Shafiq ur Rehman**, Muhammad Azam. Optimization of an ultrasound-assisted extraction method to obtain gallic acid-rich extracts from mango seed kernels. Food Science and Nutrition. 2024:12: 4038-4048.
5. Hatta F.H.M, F. N. A. Aziz, **S. U Rehman**, and A. A. Othman. 2025. The Construction of CRISPR-Cas9 System Targeting Vector for CYP3A4 Gene in Hepatic Cell Lines. Journal of Advanced Research in Applied Sciences and Engineering Technology. 43.2.178-188.
6. T. Riaz, Z. Hayat, K. Akram, K. Saleem, H. U. Rehman, M. Azam, Z. Tariq, **S. U Rehman**, A. Meraj, U. Farooq and A. Shafi. 2023. Optimization of gallic acid-enriched ultrasonic-assisted extraction from mango peels. Open Chemistry. 21.1.1-13. https://doi.org/10.1515/chem-2023-0116.
7. H. Hamed, P. N. Pushparaj, **S. U. Rehman**, S. Al-Karim, S. Bazarah and I. Qadri. 2022. Deciphering the Significance of Plasma Chemokines as Prognostic Biomarkers in Pegylated IFN-A-2a /Ribavirin-Treated Chronic Hepatitis C Genotype 4 Patients. Infectious Disorders - Drug Targets. 22 (5): 58-62. 10.2174/1871526522666220303142837

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9. S. Andleeb, N. Aslam, M. Habib, H. Zaman, S. Rehman, M. Imran and Z. Abbas.2021. Transplacental hepato-curative potential of garlic against sodium arsenate induced oxidative stress in mice. 2021. The Journal of Animal & Plant Sciences. 31(1): Page: 86-96. https://doi.org/10.36899/JAPS.2021.1.0196
10. Madiha Habib, Shehar Bano, **Shafiq -ur Rehman**, Naveed Shahzad, Nauman Javeed, Muhammad Shahbaz Aslam, and Zaigham Abbas. 2020. Hepatoprotective Role of Swimming against arsenic induced oxidative stress in mice. Journal of King Saud University-Science:32: 822-827. https://doi.org/10.1016/j.jksus.2019.02.011.
11. 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): 91-98. http://www.thejaps.org.pk/docs/V-29-01/12.pdf
12. 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. 51 (4): 1429-1437 http://dx.doi.org/10.17582/journal.pjz/2019.51.4.1429.1437
13. Syeda Zainab Ilyas, Rabia Tabassum, M. Haroon Hamed, **Shafiq ur Rehman**, and Ishtiaq Qadri. 2017. Hepatitis C Virus Associated Extrahepatic Manifestations in Lung and Heart and Antiviral Therapy Related Cardiopulmonary Toxicity. Viral Immunology**.** 30(9): 633-41. https://doi.org/10.1089/vim.2017.0009
14. 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). 1563-1569**.** http://dx.doi.org/10.17582/journal.pjz/2017.49.5.1563.1569 **0.5**
15. Maliha Uroos, Zaigham Abbas, Shumaila Sattar, Nigarish Umer, Arham Shabbir, **Shafiq Ur-Rehman**, and Ahsan Sharif. 2017. Comparison of anti-arthritic activity of n-hexane, ethyl acetate, and methanol extracts of Nyctanthes arbor-tristis using FCA-induced arthritic rat mode. Evidence-Based Complementary and Alternative Medicine. Volume 2017, Article ID 4634853, 13 pages. https://doi.org/10.1155/2017/4634853.
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17. 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. http://zsp.com.pk/pdf48/1769-1774%20(22)%20QPJZ-0414-2015-F%208-4-16.pdf
18. Yousaf, S., A. Hussain, **S. U. Rehman**, M. S. Aslam, and Z. 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.
19. Husain, A. **S. U. Rehman,** S. Aslam, N. Javed, and Z. Abbas**.** 2014. Nano-Gold Particles Mediated Detection of NS1; An Early Diagnostic Marker of Dengue Virus Infection. The Journal of Animal & Plant Sciences **24:**1110-1115. http://www.thejaps.org.pk/docs/v-24-4/21.pdf

20. Raza, F. A., **S. U. Rehman,** R. Khalid, J. Ahmad, S. Ashraf, M. Iqbal, and S. Hasnain. 2014. Demographic and clinico-epidemiological features of dengue Fever in faisalabad, pakistan. PLoS One **9:**e89868. https://doi.org/10.1371/journal.pone.0089868.

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REFERENCES

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