

DR. SAFDAR HUSSAIN, PHD

Forensic DNA Scientist | Molecular Biologist | Geneticist



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PROFESSIONAL PROFILE

Forensic DNA scientist and molecular biologist with over 19 years of combined applied forensic and academic research experience, including extensive involvement in forensic DNA casework, laboratory quality management, and method development. Trained in the USA in advanced forensic DNA profiling, with demonstrated expertise in STR-based analysis, low-template and touch DNA profiling, mixture interpretation, and forensic reporting. Experienced in postgraduate supervision and leadership of interdisciplinary forensic research activities within academic environments.

Holds a PhD in Biochemistry & Molecular Biology, with strong experimental training in mammalian cell culture, miRNA regulation, mRNA and protein expression analysis, and molecular signaling pathway characterization. Author of multiple high-impact SCI publications in forensic genetics, molecular biology, and biochemistry, reflecting a solid mechanistic research background and translational orientation.

Research interests include forensic DNA phenotyping (externally visible characteristics), forensic genomics and SNP-based marker systems, genetic genealogy, lineage markers and familial DNA analysis, touch DNA and low-template DNA analysis, forensic applications of next-generation sequencing (NGS), and population genetics for forensic inference. Basic research interests focus on the molecular mechanisms of cartilage damage and repair in rheumatoid arthritis and osteoarthritis, with particular emphasis on inflammatory signaling, extracellular matrix regulation, and regenerative pathways involved in joint disease.

EDUCATION

- **PhD – Biochemistry & Molecular Biology (2018)**
School of Basic Medical Sciences, Xi'an Jiaotong University, China
 - **MPhil – Molecular Biology (2006)**
Centre of Excellence in Molecular Biology (CEMB), University of the Punjab, Lahore, Pakistan
 - **DVM – Doctor of Veterinary Medicine (2003)**
University of Agriculture, Faisalabad, Pakistan
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ACADEMIC POSITIONS

- **Assistant Professor (BPS-19) and Head, Molecular Forensic & Genetics Research Group (2018 – present)**
Centre for Applied Molecular Biology (CAMB), University of the Punjab, Pakistan.
 - **Coordinator, Doctor of Physiotherapy (DPT) Program, (2025 – present)**
Department of Allied Health Sciences (AHS), University of the Punjab, Lahore.
 - **Chairman, Quality Enhancement Cell (QEC) (2019 – present)**
Centre for Applied Molecular Biology (CAMB), University of the Punjab, Lahore, Pakistan.
 - **DNA Technical Manager (2012-2014)**
Forensic DNA Laboratory, Centre for Applied Molecular Biology (CAMB), Lahore, Pakistan.
 - **Quality Assurance (QA) Officer (2007-2012)**
Forensic DNA Laboratory, Centre for Applied Molecular Biology (CAMB), Lahore, Pakistan.
 - **Forensic DNA Analyst (2006-2014)**
Forensic DNA Laboratory, Centre for Applied Molecular Biology (CAMB), Lahore, Pakistan.
 - **Research Officer (BPS-17) (2006-2018)**
Forensic DNA Laboratory, Centre for Applied Molecular Biology (CAMB), Lahore, Pakistan.
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RESEARCH PROJECTS

Completed

- Development of Forensic Evidence Collection Kits (Sexual Assault Evidence Collection Kit (SAECK); Trace Evidence (Touch DNA & Fingerprint) Collection Kit (TECK).
- Equine DNA profiling.
- Molecular characterization (analysis) of Gut Microbiota in Hypertension.
- Joint pain management - molecular mechanisms of Cartilage damage/repair in Osteoarthritis (OA) and Rheumatoid Arthritis (RA).

Ongoing

- Touch DNA (Recovery and Analysis)
 - Animal species identification for meat adulteration.
 - In-vivo potent effect of Fenugreek in counteracting Lead-induced toxicity.
 - Characterization of natural compounds (Curcumin, Oxyresveratrol) in airway inflammation and lung remodeling.
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RESEARCH STUDENTS SUPERVISED

- **PhDs:** 5
 - **MS/MPhil:** 31
 - **BS:** 2
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MEMBERSHIPS AND SERVICES

- Member – Departmental Research Evaluation Committee
 - Member – Course Revision Committee for MPhil & PhD programs
 - Member – MPhil and PhD Admission Committee
 - Member – Departmental Purchase Committee
 - Member/Secretary – Departmental Degree Program Committee (DDPC)
 - Member – Board of Studies, Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro, Sindh.
 - Member - Board of Studies, Lahore University of Biological & Applied Sciences (LUBAS).
 - Member, National Forensic Science Commission (NFSC), Ministry of Science & Technology (MoST), Islamabad.
 - Reviewer of research articles from different national and international journals.
 - Executed as a 'subject expert' in different departmental selection boards.
 - MPhil and PhD research theses evaluation, as an external as well as internal examiner.
 - Played a key role in establishing the first Forensic DNA Testing Laboratory in Pakistan (Prepared SOPs, QA Manual and other documents of the Quality Assurance System and performed validation studies following ISO-17025 document).
 - Served the lab for almost 10 years, working at key positions (Forensic DNA Analyst, Quality Assurance (QA) Officer, DNA Technical Manager), and solved >1000 DNA cases of various nature including murder, rape, bomb blast, dead body identification, robbery, and paternity verification etc.
 - Designed training programs for local analysts and implemented proficiency testing.
 - Conducted workshops/seminars and symposia for the Police officials, Judges and lawyers.
 - Provided court testimony as a 'DNA expert' in various criminal and paternity cases.
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PROMINENT NATIONAL/ INTERNATIONAL TRAININGS AND SCIENTIFIC SYMPOSIA/ CONFERENCES ATTENDED

- **"2006 Technology Tour"** Sponsored by Promega Corporation, Chicago, Illinois, USA (June 15, 2006).
- A seminar on **"Population and Statistical Methodology used in the Field of Human Identification"** Organized by Strand Analytical Laboratories, Indianapolis, Indiana, USA (June 19, 2006).
- A seminar on **"Advancing Justice through DNA Technology National Missing Persons Program"** Organized by Strand Analytical Laboratories, Indianapolis, Indiana, USA (August 04, 2006).
- A workshop on **"Advance Topics in Statistics"** Sponsored by Promega Corporation, at Nashville, Tennessee, USA (October 9, 2006).
- **17th International Symposium on "Human Identification"**, Sponsored by Promega Corporation, at Nashville, Tennessee, USA (October 9-12, 2006).
- A 6-month training course as a "Forensic DNA trainee" on **"DNA Short Tandem Repeat (STR) Analysis using ABI 310/3100 Genetic Analyzer"** at Strand Analytical Laboratories, Indianapolis, Indiana, USA (May 15, 2006 - November 10, 2006).
- Organized the 7th Training Workshop on **"Crime Scene Search and Modern Forensic Techniques for Crime Investigations"** jointly arranged by Strand Analytical laboratories, Indianapolis, Indiana, USA and Centre of Excellence in Molecular Biology, Lahore, Pakistan (December 15-16, 2006).
- Organized the 8th Training Workshop on **"Crime Scene Search and Modern Forensic Techniques for Crime Investigations"** jointly arranged by Strand Analytical laboratories, Indianapolis, Indiana, USA and Centre of Excellence in Molecular Biology, Lahore, Pakistan (July 18-19, 2007).
- Organized the 9th Training Workshop on **"Crime Scene Search and Modern Forensic Techniques for Crime Investigations"** at Centre of Excellence in Molecular Biology, Lahore, Pakistan (November 21-22, 2007).
- A 3-day **"Symposium on Forensic Sciences"** at Punjab Forensic Science Agency (PFSA), Lahore, Pakistan (June 23-25, 2014).
- A 3-day workshop on **"Principles of Forensic Toxicology"** held at Armed Forces Institute of Pathology, Rawalpindi, Pakistan (January 20-22, 2014).
- Hsien Wu and Ray Wu international symposium on **"Molecular Biology"** organized by Hsien Wu and Ray Wu team, at University of Beijing, China, (August 11-12, 2015).
- Organized the Hsien Wu and Ray Wu international symposium on **"Metabolism Reprogramming"** jointly organized by Xi'an Jiaotong University and Hsien Wu and Ray Wu team, Xi'an Shaanxi, China (August 11-12, 2017).

- 45th Silk Road Training Program on “**Frontier Development of Medical Science and Technology & Big Data Theory Applications**” arranged by Xi’an Jiaotong University, Xi’an Shaanxi, China (November 9-14, 2018).
 - First International Conference on “**Recent Innovations in Molecular Sciences**” organized by University of the Punjab, Lahore, Pakistan (November 6-8, 2019).
 - A training seminar on “**HOW TO IMPROVE/IMPLEMENT HEC-QAA PARAMETERS**”, organized by Quality Enhancement Cell (QEC), University of the Punjab, Lahore (March 03, 2022).
 - “**International Health Symposium**” jointly organized by Centre of Excellence in Molecular Biology (CEMB) and Centre for Applied Molecular Biology (CAMB), University of the Punjab Lahore (Nov. 17, 2022).
 - Launching ceremony of “**Asian Federation of Biotechnology (AFOB) – Pakistan Chapter**”, Co-hosted by National Institute of Biotechnology and Genetic Engineering, University of Agriculture Faisalabad, and Government College University, Faisalabad (Feb. 27, 2023).
 - Training Workshop on “**Generative Artificial Intelligence in Teaching and Course Designing in Higher Education**” organized by Punjab Higher Education Commission (PHEC), at University of Veterinary and Animal Sciences (UVAS), Lahore (Feb. 14-15, 2024).
 - 2-day hands on training workshop on “**Structural Bioinformatics**” organized by Centre for Applied Molecular Biology (CAMB), University of the Punjab Lahore (Jan. 04-05, 2025).
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PUBLICATIONS

- [1] Shafique M, Hussain M, Shan MA, Shahzad M, **Hussain S**, Hussain N, Ehsan F, Perveen R, Iqbal M. Genetic diversity of 15 autosomal STR loci in the population of Southern Punjab Pakistan [J] *Forensic Sci Int Genet*, 2015, 19:e1-e2. (SCI, IF=3.91)
- [2] Rakha A, Yu NO, Kyoung JS, Adnan A, **Hussain S**, Waryah AM, Hwan YL. Male individualization with Rapidly Mutating Y-STRs in deep rooted endogamous pedigrees from Sindhi population of Pakistan. Conference: HM2016, at Germany. (Conference paper).
- [3] Hussain N, Wenhua Z, Congshan J, Jing X, Xiaoying W, Manman G, **Hussain S**, Yongsong C, Ke X, Peng X, Yan H, Jian S, Liesu M, Shemin L. Down-regulation of miR-10a-5p in synoviocytes contributes to TBX5-controlled joint inflammation [J] *J Cell Mol Med*, 2017, 22(1): 241-250. (SCI, IF=4.5)
- [4] Jian S, Zixin M, Zhao W, **Hussain S**, Yitong Z, Dongxian G, Fujun Z, Yuanxu G, Mengyao S, Huang H, Yan H, Nannan Z, Peng X, Shemin L. T-2 toxin exposure decreases SECISBP2 mediated selenoproteins expression and induces lesions in the epiphyseal plates of DA rats, exacerbated by selenium deficiency [J] *Cartilage*, 2018. (SCI, IF=2.62)
- [5] Zixin M, Yuanxu G, Mengyao S, **Hussain S**, Dongxian G, Ying Y, Yitong Z, Lisong H, Huang H, Fujun Z, Yan H, Jiawen X, Nannan Z, Jian S, Shemin L. Selenium-sensitive miRNA-181a-

- 5p targeting SECISBP2 regulates selenoproteins expression in cartilage [J] *J Cell Mol Med*, 2018, DOI: 10.1111/jcmm.13858. (SCI, IF=4.49)
- [6] **Hussain S**, Mengyao S, Zixin M, Yuanxu G, Jing X, Mushtaq N, Lisong H, Huang H, Yitong Z, Ying Y, Hussain N, Fujun Z, Yan H, Peng X, Jian S, Shemin L. Down-regulated in OA cartilage, SFMBT2 contributes to NF- κ B mediated ECM degradation [J] *J Cell Mol Med*, 2018, DOI: 10.1111/jcmm.13826. (SCI, IF=4.49)
- [7] **Hussain S**, Mengyao S, Yuanxu G, Mushtaq N, Yitong Z, Ying Y, Hussain N, Kombo OE, Suleiman A, Sadiq M, Fujun Z, Yan H, Jian S, Shemin L. SFMBT2 positively regulates SOX9 and Chondrocytes proliferation [J] *Int J Mol Med*, 2018, DOI: 10.3892/ijmm.2018.3894. (SCI, IF=2.78)
- [8] Yuanxu G, Zixin M, Congshan J, Wei W, Jidong Y, Peng X, Ke X, Jing X, Mengyao S, Yitong Z, **Hussain S**, Rui Z, Quancheng W, Yan H, Fujun Z, Wenhua Z, Dongmin L, Liesu M, Jian S, Shemin L. Downregulation of HS6ST2 by miR-23b-3p enhances matrix degradation through p38 MAPK pathway in osteoarthritis [J] *Cell Death Dis*, 2018, 9(6): 699. (SCI, IF=5.96)
- [9] Mushtaq N, **Hussain S** and Jiru X. Molecular Characterization of Gut Microbiota in Obese and Lean Hypertensive Patients [J] *J Bacteriol Parasitol*, 2018, 9(5): 345. (IF=2.025)
- [10] Mushtaq N, **Hussain S**, Yuan L, Zhang S, Li H, Ullah S and Jiru X. Gender Based Compositional Fluctuations in Gut Microbiota in Hypertension. [J] *Cardiovasc Pharm Open Access*, 2018, 7: 248. (IF=1.77)
- [11] Hussain N, Wenhua Z, Congshan J, Jing X, Manman G, Xiaoying W, **Hussain S**, Wang B, Rajoka MSR, Li Y, Tian J, Liesu M, Shemin L. Down-regulation of miR-10a-5p promotes proliferation and restricts apoptosis via targeting T-box transcription factor 5 in inflamed synoviocytes [J] *Biosci Rep*, 2018, 38(2). (SCI, IF=2.9)
- [12] Rakha A, Yu NO, Hwan YL, **Hussain S**, Waryah AM, Adnan A, Kyoung JS. Discriminating Power of Rapidly Mutating Y-STRs in deep rooted endogamous pedigrees from Sindh population of Pakistan [J] *Legal Med*, 2018, DOI: 10.1016/j.legalmed.2018.08.001. (SCI, IF=1.25)
- [13] Mengyao S, **Hussain S**, Yuxiao H, Jidong Y, Zixin M, Xi L, Yuanxu G, Yitong Z, Huang H, Meng F, Yan H, Fujun Z, Wenhua Z, Liesu M, Dongmin L, Jian S and Shemin L. Maintenance of SOX9 stability and ECM homeostasis by selenium-sensitive PRMT5 in cartilage [J] *Osteoarthritis and Cartilage*, 2019, DOI: 10.1016/j.joca.2019.02.797. (SCI, IF=5.45)
- [14] Mushtaq N, **Hussain S**, Zhang S, Yuan L, Li H, Ullah S, Wang Y and Xu J. Molecular characterization of alterations in the intestinal microbiota of patients with grade 3 hypertension [J] *Int J Mol Med*, 2019, DOI: 10.3892/ijmm.2019.4235. (SCI, IF=2.78)
- [15] Mateen RM, Sabar MF, **Hussain S**, Parveen R, Hussain M. Familial DNA analysis and criminal investigation: Usage, downsides and privacy concerns. *Forensic Science International*. 2020 Nov 4:110576. (SCI, IF=2.108)

- [16] Maqsood M, Imran Hasan Khan M, Yameen M, Aziz Ahmed K, Hussain N and **Hussain S**. Use of oral rivaroxaban in cerebral venous thrombosis. *Journal of drug assessment*. 2020 Dec 15;10(1):1-6. (ESCI)
- [17] Jian S, Quancheng W, Ying Y, **Hussain S**, Yitong Z, Yuanxu G, Mengyao S, Huang H, Xinyu H, Fujun Z, Qilan N, Yan H, Peng X and Shemin L. Identification of a cartilage specific novel miRNA which directly targets PRMT3 in rats. *Osteoarthritis and Cartilage Open*. 2021 Jun 1;3(2): 100161 (SCI, IF=6.576)
- [18] Zhao Y, Guo Y, Sun M, **Hussain S**, Zheng Y, Huang H, Huo X, Zhao Y, Zhang F, Han Y, Ning Q. Selenium-sensitive histone deacetylase 2 is required for forkhead box O3A and regulates extracellular matrix metabolism in cartilage. *Journal of Bone and Mineral Metabolism*. 2022 Nov;40(6):914-26. (IF: 2.976).
- [19] Fatima M, **Hussain S**, Babar M, Aftab U, Mushtaq N and Rehman HM. Microbiome and Metagenome Signatures: The Potential Toolkit for Futuristic Forensic Investigations. *Int J Forens Sci*. 2022-Sept (IF: 1.6).
- [20] Faheem MA, Akhtar T, Naseem N, Aftab U, Zafar MS, **Hussain S**, Shahzad M, Gobe GC. Chrysin Is Immunomodulatory and Anti-Inflammatory against Complete Freund's Adjuvant-Induced Arthritis in a Pre-Clinical Rodent Model. *Pharmaceutics*. 2023 Apr 12;15(4):1225. (IF: 6.525)
- [21] Yuan L, Zhang R, Li X, Gao C, Hu X, **Hussain S**, Zhang L, Wang M, Ma X, Pan Q, Lou X. Long-term simulated microgravity alters gut microbiota and metabolome in mice. *Frontiers in Microbiology*. 2023;14. (IF: 6.064).
- [22] Khan MU, Akhtar T, Naseem N, Aftab U, **Hussain S** and Shahzad M. Evaluation of therapeutic potential of ivermectin against complete Freund's adjuvant induced arthritis in rats: involvement of inflammatory mediators. *Fundamental & Clinical Pharmacology*. 2023 Apr 21. (IF: 2.747).
- [23] Muhammad H, Salahuddin Z, Akhtar T, Aftab U, Rafi A, **Hussain S**, Shahzad M. Immunomodulatory effect of glabridin in ovalbumin induced allergic asthma and its comparison with methylprednisolone in a preclinical rodent model. *Journal of Cellular Biochemistry*. 2023 Aug 16. (IF: 4).
- [24] Fatima M, **Hussain S**, Babar M, Shahzad M, Zafar MS. Curcumin: A Potential Therapeutic Agent for Human Health and Diseases–Current Status and Future Perspectives. *Pharmacological Benefits of Natural Agents*. 2023:278-97. IGI Global
- [25] Asif A, Naseem N, Akhtar T, Aftab U, Rafi A, **Hussain S**, Shahzad M. Evaluation of the anti-fibrotic effect of thymoquinone in the management of oral submucous fibrosis. *Odontology*. 2025 Sep 27:1-9.
- [26] Fatima M, **Hussain S**, Babar M, Shahzad M, Zafar MS. Curcumin: A Potential Therapeutic Agent for Human Health and Diseases–Current Status and Future Perspectives. In *Pharmacological Benefits of Natural Agents*. 2023:278-97. IGI Global Scientific Publishing (Book Chapter).

- [27] Fatima M, **Hussain S**, Zulfiqar I, Shehzadi I, Babar M, Fatima T. Lifestyle Modifications Needed Post COVID-19 Infection. In *Clinical Practice and Post-Infection Care for COVID-19 Patients 2024* (pp. 109-134). IGI Global. (Book Chapter).
- [28] Fatima M, **Hussain S**, Babar M, Mushtaq N, Fatima T. Management of Diabetes Complications During and After COVID-19. In *Clinical Practice and Post-Infection Care for COVID-19 Patients 2024* (pp. 135-160). IGI Global. (Book Chapter).
- [29] Fatima M, **Hussain S**, Zafar S, Zahra N. Engineering Stress Tolerance in Plants Using miRNAomics Approach: Challenges and Future Perspectives. *miRNAomics and Stress Management in Plants*. 2025:148-59. Tylor & Francis Group. (Book Chapter).
- [30] **Hussain S**, Mushtaq N. Understanding Zinc and Its Importance in Human Health. In *Strategies to Alleviate Human Zinc Deficiency 2025* (pp. 1-18). IGI Global Scientific Publishing. (Book Chapter).
- [31] Fatima M, **Hussain S**, Ahmad N, Ahmad HR, Liaquat G, Salma H, Nadeem M, Abbasi GH, Ali M, Jameel T, Imran M. Bioactive Compounds of *Ficus religiosa* L. and its Antiviral Activity. In *Antiviral Secrets of Medicinal Plants 2025 Nov 12* (pp. 174-200). CRC Press. (Book Chapter).