	CURRICULUM VITAE	
Name Designation Institute	JAVED NAIM AGREWALA Professor Indian Institute of Technology Ropar	
Correspondence	Department of Biomedical Engineering, Indian Institute of Technology Ropar, Rupnagar-140001, Punjab, India Email: jagrewala@iitrpr.ac.in, jagrewala@gmail.com Tel: +91-9417869408, +91-1881-1055 website: www.iitrpr.ac.in	

EDUCATION

Degree	Year	Division	University/College	Subjects
BSc	1980	First	Agra University, Agra	Chemistry, Zoology, Botany
MSc	1982	First	Agra University, Agra	Chemistry
PhD	1986		Agra University, Agra	Biomedical Organic Chemistry

EMPLOYMENTS

Post	Duration	Name of Organization	Duties
Professor & Dean Research	March 20, 2018-contd.	Indian Institute of Technology, Ropar	Research, teaching & administration
Chief Scientist	Sep 17, 2010-March 19, 2018	CSIR-Institute of Microbial Technology, Chandigarh	Research, teaching & administration
Scientist F	June 2009-Aug 2010	CSIR-Institute of Microbial Technology, Chandigarh	Research, teaching & administration
Scientist EII	June 2004-July 2009	CSIR-Institute of Microbial Technology, Chandigarh	Research, teaching & administration
Scientist E1	June 1999-July 2004	CSIR-Institute of Microbial Technology, Chandigarh	Research, teaching & administration
Visiting Scientist	April 2001-June 2002	Immunology Laboratory, Trudeau Institute, Saranac Lake, NY 12983, USA	Research
Scientist C	June 1994-July 1999	CSIR-Institute of Microbial Technology, Chandigarh	Research, teaching & administration
Visiting Scientist	June 1994 to June 1996	MRC-TB and Related Infections Unit, Royal Postgraduate Medical School, Hammersmith Hospital, London. United Kingdom	Research
Scientist B	June 1989 to July 1994	CSIR-Institute of Microbial Technology, Chandigarh	Research, teaching & administration
Research Associate	Sep 1986 to June 1989	Central JALMA Institute for Leprosy, Agra	Research

HONORS & AWARDS

Awards/Honours	ORGANIZATION
Shanti Swarup Bhatnagar Award	Council of Scientific & Industrial Research, New Delhi. Award was conferred by the Prime Minister of India, 2005
UP Science Award	Government of Uttar Pradesh. Award was given by the Governor and Chief Minister of Uttar Pradesh, 2018

JC Bose Fellowship	Department of Science and Technology, India, 2018
FNA	Fellowship was provided by the President of India at the Indian National Science Academy meeting, 2010
FAS	Indian Academy of Sciences, 2014
FNASc	National Academy of Sciences India, 2004
FAMSc	Microbiology Society of India, 2022
National Bioscience Award for Career Development	Department of Biotechnology, New Delhi Award was given by the Minister of Science and Technology, India, 2006
New Idea Funding (NIF) Award	Council of Scientific & Industrial Research, New Delhi, India, The award was given by the Director-General, CSIR, 2000
Fellowship: Medical Research Council [MRC], UK	To work at the MRC-TB & Infectious Disease Unit, Royal Postgraduate Medical School, London [1994-1996].
Visiting Scientist	1. MRC-TB Unit, Royal Postgraduate Medical School, Hammersmith Hospital, London [1994-1996]. 2. Trudeau Institute, Saranac Lake, New York [2001-2002].
Senior Scientist Oration Award	The Indian Immunology Society, 2022
Distinction Fellow	The Academy of Microbiological Sciences, 2022
Invited by the Sandia National Laboratories, USA to deliver a talk on "Controlling Laboratory Biorisks".	Sandia National Laboratories, Albuquerque, USA [April 27-May 2, 2009].
Invited by the USA Department of State's Biosecurity Engagement Program to deliver a talk on "BSL3 Science and Safety".	The U.S. Department of State's Biosecurity Engagement Program [BEP], USA [May 18-23, 2008] at the Rollins School of Public Health at Emory University, Atlanta, USA
Invited by the Bureau of International Security and Nonproliferation, USA to to deliver a talk at the CDCs 10th International Symposium on "Biosafety and Biosecurity", CDC, Atlanta, USA	Bureau of International Security and Nonproliferation, United States Department of State, USA [Feb 9-13, 2008]
Bill & Melinda Gates Award for High Quality Research, Vaccine Congress, Shanghai, China	Bill & Melinda Gates Foundation, 2012
Awarded travel grant to present paper at "The CREST Symposium" Sendai, Japan	Japan Science and Technology Corporation, Japan. 2001
Excellence in Flow Cytometry	Becton & Dickinson Biosciences, USA [2012]
Member	1. American Association of Immunologists 2. International Federation of Biosafety Associations 3. Indian Immunology Society 4. Indian Science Congress 5. Molecular Immunology Forum 6. The Academy of Microbiological Sciences

Editorial Manager/Member Editorial Board/Associate Editor/Reviewer	Nat Com, Autophagy, PLoS Pathogens, Gut Microbiome, J Infect Dis, Brain Behaviour Immunity, J Bac, Can Immunother Immunol, E Biomed, FASEB, J Proteome Res, Eur J Immunol, Infection Immunity, J Neuroimmunol, Gut Microbes, eLife, mBio, Front Immunol., Front Cellular Infection Microbiol. Scientific Reports, Exploration of Immunology, PLoS One, BMC Immunology, Immunology, Vaccine, PLoS Neglected Tropical Diseases, Molecular Immunol, Pharmacology, Recent Patents on Anti-Infective Drug Discovery, Amino Acids, Clin Exp Immunol, Inflammation Res. Cancer Lett, Microbiol Immunol, J Med Microbiol, Int Immunopharmacol, Hematologia, Exp Parasitol, Polish J Food Nutr Sci, Adv Applied Res, Current Science, J Bioscience, Indian J Med Res, etc.
Research grants	MHRD, DBT, CSIR and ICMR
DBT Overseas Associateship	Department of Biotechnology, India
Research Associateship	Biotechnology and Biological Sciences Research Council, UK
Research Associateship	Indian Council of Medical Research, India
Senior Research Fellowship	Indian Council of Medical Research, India
Junior Research Fellowship	Indian Council of Medical Research, India

	Invited lectures abroad and / or chaired scientific session at the international conference / symposium				
	Title of the talk	Name of the Conference/purpose	Dates	Venue	Organizer
	Mycobacterium tuberculosis evades the immune system by impairing the function of dendritic cells by converting them to myeloid-derived suppressor cells by its Rv1980cprotein	18th International Congress of Immunology [invited talk]	Nov 27-Dec 2, 2023	Cape Town, South Africa	International Union of Immunological Societies
		Bilateral-academic visit	April 2019	Ireland	
		Bilateral-academic visit	April 2019	UK	
	Signaling of infected macrophages through Clec4e: an innovative strategy to restrict the survival of *Mycobacterium tuberculosis*	17th International Congress of Immunology	Sep 19 – 23, 2019	Beijing, China	International Union of Immunological Societies
	Lipidated promiscuous peptide of *M. tuberculosis* augments polyfunctional Th1 cells and Th17 cells	World Congress of Infectious Diseases [invited talk and chaired session]	August 10-12, 2015	London, UK	European Society of Infectious Diseases

	Self-adjuvanting peptide of *M. tuberculosis* evokes better protection than BCG	15th Asia-Pacific Congress of Clinical Microbiology and Infection [invited talk and chaired session]	Nov 26-29, 2014	Kuala Lumpur, Malaysia	Asia Pacific Society of Clinical Microbiol ogist
	Elicitation of enduring and robust protective memory T cell response by Pam2Cys-peptide vaccine	International Congress of Immunology [invited talk]	Aug 22-27, 2014	Milan, Italy	Internation al Union of Immunolo gical Societies
	Induction of the activation of enduring immunity by lipidated peptide vaccine against *M. tuberculosis*	6th Vaccine & ISV Congress [invited talk and chaired session]	Oct 14-16, 2012	Shanghai, China	Internation al Society of Vaccine
	Lipidated peptide induces protection against *M. tuberculosis* by activating innate and adaptive immunity	Tuberculosis 2012 [invited talk]	Sep 11-15, 2012	Paris, France	EMBO
	Targeting of lipidated peptide to dendritic cells and protection against *M. tuberculosis*	Invited talk	March 19-22, 2012	University of Melbourne, Australia	University of Melbourne
	Coadministration of IL-7 and IL-15 with BCG mounts enduring T cell memory response against *M tuberculosis*	Invited talk	March 22-24, 2012	University of Sydney, Australia	University of Sydney
	Induction of long-lasting T cell memory against *M. tuberculosis* on vaccination with promiscuous peptide of 16 kDa antigen linked to PamCys	Immunology conference [invited talk]	May 13-17, 2011	San Francisco, USA	American Associatio n of Immunolo gists
	Caerulomycin A suppresses the function of both T cells and B cells	International Conference on Drug Discovery and Therapy [invited talk and chaired session]	Feb 7-10, 2011	Dubai	Society of Drug Discovery & Therapy
	IL-7 and IL-15 promote long-lasting T cell memory against BCG	3rd Vaccine Global Congress [invited talk and chaired session]	October 4-6, 2009	Singapore	Internation al Society of Vaccine

	Signaling through CD80 induces apoptosis in B cell lymphomas	First International Congress of Biochemistry and Molecular Biology [invited talk and chaired session]	Sep 11-15, 2005	Tarbiat Modares University, Tehran, Iran	Society of Biochemistry and Molecular Biology, Iran
	Migratory and homing preferences of Th1 and Th2 cells	Invited talk	July 14, 2002	Department of Microbiology and Immunology, Health Science Center, Kuwait	Health Science Center, Kuwait
	Unique ability of activated CD4 T cells but not rested effectors to migrate to non-lymphoid sites in the absence of inflammation	Invited talk	Dec 2, 2002	Statens Serum Institute, Copenhagen, Denmark	Statens Serum Institute
	Regulation of memory CD4 T cells: generation, localization and persistence	Molecular Approaches to Vaccine Design [invited talk]	Nov 29-Dec 2, 2001	Cold Spring Harbor, New York, USA	International Society of Vaccine
	Peptide recognition by T-cell clones of an HLA-DRB1*1501/*0901 heterozygous donor is promiscuous only between parental alleles	Acid Fast Club Symposium [invited talk]	May 13, 1996	London School of Hygiene and Tropical Medicine, London	London School of Hygiene and Tropical Medicine

Invited lectures in India and/or chaired scientific sessions at the international conference/symposium**:** Several

PUBLICATIONS [131]

1. **Int J Biol Macromol** [IF 8.2] 14:2024:274. A novel strategy to elicit enduring anti-morphine immunity and relief from addiction by targetting Acr1 protein nano vaccine through TLR-2 to dendritic cells. Nanda S, Zafar MA, Lamba T, Malik JA, Khan MA, Bhardwaj P, Bisht B, Ghadi R, Kaur G, Bhalla V, Sehrawat S, Owais M, Jain S, **Agrewala JN**.

2. **Eur J Pharmacol**. 26:2024: 176856 [IF: 5.6]. From Defense to Dysfunction: Autophagy's Dual Role in Disease Pathophysiology. Malik JA, Zafar MA, Singh S, Nanda S, Bashir H, Das DK, Lamba T, Khan MA, Kaur G, **Agrewala JN**.

3. **Nanoscale** 25:2024:14006 [IF: 5.8]. Shielding against breast tumor relapse with an autologous chemo-photo-immune active nano-micro-sera based fibrin implant. Mimansa, Zafar MA, Verma DK, Das R, **Agrewala JN**, Shanavas A.

4. **Eur J Pharmacol**. 975:2024:176637 [IF: 5.6]. Immunosuppressive effects of morphine on macrophage polarization and function. Malik JA, Khan MA, Lamba T, Zafar MA, Nanda S, Owais M, **Agrewala JN**.

5. **Medical Hypotheses** 186:2024:111335. [IF: 4.7]. Morphine acts via TLR4 resulting in neuroinflammation and immunosuppression. Malik JA, Kaur G, **Agrewala JN**.

6. **Aging Cell** 22:2023:13838. [IF: 11]. Age mediated gut microbiota dysbiosis promotes loss of tolerogenic potential in dendritic cells. Bashir H, Singh S, Singh RP, **Agrewala JN***, Kumar R*.

7. **Gut Microbiome** 15:2023:2290643. [IF: 9.4]. The impact of aging-induced gut microbiome dysbiosis on dendritic cells and lung. Diseases. Malik JA, Zafar MA, Lamba T, Nanda S, Khan MA, **Agrewala JN**.

8. **Int J Biol Macromol**. 5:2023: 253. [IF: 8.05]. Revolutionizing medicine with toll-like receptors: a path to strengthening cellular immunity. Malik JA, Kaur G, **Agrewala JN**.

9. **J Mol Liquids**. 383:2023: 122170. [IF: 6.63]. Dox-loaded TPU-PLGA nanoparticles embedded chitosan hydrogel formulation as an effective anti-cancer therapy. Manhas P, Sharma R, Wangoo N, Saini R, Saima, **Agrewala JN**, Sharma RK.

10 **Int Immunopharmacol**. 119:2023:110210. [IF: 5.7]. Future perspectives of emerging novel drug targets and immunotherapies to control drug addiction. Malik JA, **Agrewala JN**.

11 **J Biosci**. 48: 2023: 33. [IF: 2.8] Influence of chronic administration of morphine and its withdrawal on the behavior of zebrafish. Malik JA, Nanda S, Zafar MA, Sehrawat S, **Agrewala JN**.

12 **J Biol Chem**. 2022 Oct 15:102596. [IF: 5.49]. *Mycobacterium tuberculosis* epitope entrapped in nanoparticles expressing TLR-2 ligand targeted to dendritic cells elicit protective immunity. Das DK, Zafar MA, Nanda S, Singh S, Lamba T, Bashir H, Singh P, Maurya SK, Nadeem S, Sehrawat A, Bhalla V, **Agrewala JN**.

13 **Cell Mol Life Sci.** 79:2022:567 [IF: 9.2]. *Mycobacterium tuberculosis* exploits MPT64 to generate myeloid-derived suppressor cells to evade the immune system. Singh S, Maurya SK, Aqdas M, Bashir H, Arora A, Bhalla V, **Agrewala JN**.

14 **Vaccines** 10,2022.1006 [IF: 4.97]. Fiction and facts about BCG imparting trained immunity against COVID-19. Kaur G, Singh S, Nanda S, Zafar MA, Malik JA, Arshi MU, Lamba T, **Agrewala JN**.

15 **Autophagy** 17:2021:1 [IF: 16.01]. Guidelines for the use and interpretation of assays for monitoring autophagy. Klionsky DJ, Abdel-Aziz AK, Abdelfatah S, Abdellatif M, Abdoli A, Abel S, Abeliovich H, Abildgaard MH, Abudu YP, Acevedo-Arozena A, Adamopoulos IE, Adeli K, Adolph TE, Adornetto A, Aflaki E, Agam G, Agarwal A, Aggarwal BB, Agnello M, Agostinis P, **Agrewala JN**, et al.

16 **ACS Infectious Dis**. 12:2021:2999 [IF: 5.5]. Immunotherapeutic role of NOD-2 and TLR-4 signaling as an adjunct to anti-tuberculosis chemotherapy. Aqdas M, Maurya S, Pahari S, Singh S, Khan N, Sethi K, Kaur G, Agrewala JN.

17 **Front Cellular Infection Microbiol**. 7:2021:11 [IF: 5.29]. Cumulative signaling through NOD-2 and TLR-4 eliminates the *Mycobacterium tuberculosis* concealed inside the mesenchymal stem cells. Aqdas M, Singh S, Amir M, Maurya S, Pahari S, **Agrewala JN**.

18 **J Mol Liquids**. 15:2021:115385. [IF: 5.1]. Protein transduction domain functionalized gold nanoparticles for effective delivery of potent cytotoxic agent in cancer cells. Bansal K, Devi N, Aqdas M, Sharma RK, **Agrewala JN**, Katare OP.

19 **J Drug Delivery Sci Tech**. 65:2021:102743 [IF: 4]. Mechanistic evaluations of ketoconazole lipidic nanoparticles for improved efficacy, enhanced topical penetration, cellular uptake (L929 and J774A.1), and safety assessment: In vitro and in vivo studies Ramzan M, Kaur G, Trehan T**, Agrewala JN**, Michniak-Kohn BB, Hussain A, Mahdi WA, Gulati JS, Kaur IP.

20 **Autophagy** 16:2020:1021 [IF: 16.01]. Induction of autophagy through Clec4e in combination with TLR-4: an innovative strategy to restrict the survival of *Mycobacterium tuberculosis.* Pahari S, Negi S, Aqdas M, Arnett E, Schlesinger LS, **Agrewala JN**.

21 **Eur J Immunol.** 16:2020:10 [IF: 6.8]. Intestinal microbiota disruption limits the isoniazid mediated clearance of *Mycobacterium tuberculosis* in mice. Negi S, Pahari S, Bashir H, **Agrewala JN.**

22 **J Proteome Res**. [IF: 4.46]. 19:2020:4655. Deciphering the structural enigma of HLA class-II binding peptides for enhanced immunoinformatics-based prediction of vaccine epitopes. Chatterjee D, Priyadarshini P, Das DK, Mushtaq K, Singh B, **Agrewala JN**.

23 **Front Immunol**. 11:2020:726 [IF: 8.8]. Gut dysbiosis thwarts the efficacy of vaccine against *Mycobacterium tuberculosis*. Nadeem S, Maurya SK, Das DK, Khan N, **Agrewala JN**.

24 **BMC Infectious Diseases** 20:2020:677 [IF: 3.1]. A multiple T cell epitope comprising DNA vaccine boosts the protective efficacy of Bacillus Calmette Guerin (BCG) against *Mycobacterium tuberculosis*. Maurya SK, Aqdas M, Das DK, Singh S, Nadeem S, Kaur G, **Agrewala JN**.

25 **Cancer Immunol Immunother**. 68:2019:1995 [IF: 7.0]. Predominance of M2 macrophages in gliomas leads to the suppression of local and systemic immunity. Vidyarthi A, Agnihotri T, Khan N, Singh S, Tewari MK, Radotra BD, Chatterjee D, **Agrewala JN**.

26 **Front Immunol.** 10:2019:2441 [IF: 8.8]. Potential role of gut microbiota in the induction and regulation of innate immune memory. Negi S, Das DK, Pahari S, Nadeem S, **Agrewala JN**.

27 **Front Immunol**. 10:2019:1142 [IF: 8.8]. Gut microbiota regulates mincle mediated activation of lung dendritic cells to protect against *Mycobacterium tuberculosis*. Negi S, Pahari S, Bashir H, **Agrewala JN**.

28 **Front Microbiol**. 10:2019:1173 [IF: 6.1]. Curdlan limits *Mycobacterium tuberculosis* survival through STAT-1 regulated Nitric oxide production. Negi S, Pahari S, Das DK, Khan N, **Agrewala JN**.

29 **Sci Rep**. 9:2019:3092. [IF: 5.6]. ImmtorLig_DB: repertoire of virtually screened small molecules against immune receptors to bolster host immunity. Chatterjee D, Kaur G, Muradia S, Singh B, **Agrewala JN**.

30 **BMC Microbiol**. 19:2019:64. [IF: 3.6]. A genomic analysis of *Mycobacterium immunogenum* strain CD11_6 and its potential role in the activation of T cells against *Mycobacterium tuberculosis*. Kaur G, Chander AM, Kaur G, Maurya SK, Nadeem S, Kochhar R, Bhadada SK, **Agrewala JN***, 5, Mayilraj S*.

31 **Cancer Medicine** 8:2019:246. [IF: 4.45]. Low prevalence of anti-xenobiotic antibodies among the occupationally exposed individuals is associated with a high risk of cancer. Sajid M, **Agrewala JN**.

32 **Front Immunol**. 9:2018:1650 [IF: 8.8]. TLR-3 stimulation skews M2 macrophages to M1 through IFN-αβ signaling and restricts tumor progression. Vidyarthi A, Khan N, Agnihotri T, Negi S, Das DK, Colegio OR, Tewari MK, **Agrewala JN**.

33 **J Trans Med**. 16:2018:279 [IF: 8.44]. A lipidated bi-epitope vaccine comprising of MHC-I and MHC-II binder peptides elicits protective CD4 T cell and CD8 T cell immunity against *Mycobacterium tuberculosis*. Rai PK, Chodisetti SB, Maurya SK, Nadeem S, Zeng W, Janmeja AK, Jackson DC, Agrewala JN.

34 **Front Immunol**. 9:2018:193 [IF: 8.8]. Reinforcing the functionality of mononuclear phagocyte system to control tuberculosis. Pahari S, Kaur G, Negi S, Aqdas M, Das DK, Bashir H, Singh S, Nagare M, Khan J, **Agrewala JN**.

35 **Bioconjugate Chemistry** 29:2018:1102 [IF: 4.8]. A facile approach for synthesis and intracellular delivery of size tunable cationic peptide functionalized gold nanohybrids in cancer cells. Bansal K, Aqdas M, Kumar M, Bala R, Singh S, **Agrewala JN**, Katare O, Sharma R, Wangoo N.

36 **Front Immunol**. 8:2017:624 [IF: 8.8]. Diametric role of the latency-associated protein acr1 of *mycobacterium tuberculosis* in modulating the functionality of pre and post maturational stages of dendritic cells. Amir M, Aqdas M, Nadeem S, Siddiqui KS, Khan N, Sheikh JS, **Agrewala JN**.

37 **J Trans Med**. 15:2017:201 [IF: 8.44]. A Lipidated peptide of *Mycobacterium tuberculosis* resuscitates the protective efficacy of BCG vaccine by evoking memory T cell immunity. Rai PK, Chodisetti SB, Zeng W, Nadeem S, Maurya SK, Pahari S, Janmeja AK, Jackson DC, **Agrewala JN**.

38 **Front Microbiol.** 8:2017:1938 [IF: 6.1]. Morbid sequences suggest molecular mimicry between microbial peptides and self-antigens: a possibility of inciting autoimmunity. Pahari S, Chatterjee D, Negi S, Kaur J, Singh B, **Agrewala JN**.

39 **Front Immunol.** 8:2017:906 [IF: 8.8]. Bolstering immunity through pattern recognition receptors: a unique approach to control tuberculosis. Pahari S, Kaur G, Aqdas M, Negi S, Chatterjee D, Bashir H, Singh S, **Agrewala JN**.

40 **Autoimmunity** [IF: 2.6] 2017 Jul 7:1-12. Caerulomycin A suppresses the differentiation of naïve T cells and alleviates the symptoms of experimental autoimmune encephalomyelitis. Kujur W, Gurram RK, Maurya SK, Nadeem S, Chodisetti SB, Khan N, **Agrewala JN**.

41 **PLoS One**. 12:2017:e0173769. [IF: 3.2]. Antibody response against PhoP efficiently discriminates among healthy individuals, tuberculosis patients and their contacts. Vidyarthi A, Khan N, Agnihotri T, Siddiqui KF, Nair GR, Arora A, Janmeja AK, **Agrewala JN**.

42 **Crit Rev Microbiol**. 1:2016:1 [IF: 8.2]. T cell exhaustion in tuberculosis: pitfalls and prospects. Khan N, Vidyarthi A, Amir M, Mushtaq K, **Agrewala JN**.

43 **Front Immunol**. 7:2016:529 [IF: 8.8]. Alteration in the gut microbiota provokes susceptibility to tuberculosis. Khan N, Vidyarthi A, Nadeem S, Negi S, Nair G, **Agrewala JN.**

44 **Scientific Reports** 6:2016:39492. [IF: 5.6]. Infergen stimulated macrophages restrict *Mycobacterium tuberculosis* growth by autophagy and release of nitric oxide. Pahari S, Khan N, Aqdas M, Negi S, Kaur J, **Agrewala JN**.

45 **Gut Pathog**. 8:2016:55. [IF: 5.3] Genome sequencing, assembly, annotation and analysis of Staphylococcus xylosus strain DMB3-Bh1 reveals genes responsible for pathogenicity. Kaur G, Arora A, Sathyabama S, Mubin N, Verma S, Mayilraj S, **Agrewala JN**.

46 **Front Immunol**. 7:2016:386 [IF: 8.8]. Stimulation through CD40 and TLR-4 is an effective host directed therapy against *Mycobacterium tuberculosis*. Khan N, Pahari S, Vidyarthi A, Aqdas M, **Agrewala JN**.

47 **Scientific Reports** 6:2016:27263 [IF: 5.6]. Triggering through NOD-2 Differentiates Bone Marrow Precursors to Dendritic Cells with Potent Bactericidal activity. Khan N, Aqdas M, Vidyarthi A, Negi S, Pahari S, Agnihotri T, **Agrewala JN**.

48 **Scientific Reports** 6:2016:23917 [IF: 5.6]. A novel therapeutic strategy of lipidated promiscuous peptide against *Mycobacterium tuberculosis* by eliciting Th1 and Th17 immunity of host. Rai PK, Chodisetti SB, Nadeem S, Maurya SK, Gowthaman U, Zeng W, Janmeja AK, Jackson DC, **Agrewala JN**.

49 **J Data Mining Genomics Proteomics** 7:2016:2. Genome mining and comparative genomic analysis of five coagulase-negative staphylococci (cns) isolated from human colon and gall bladder. Nair RG, Kaur G, Khatri I, Singh NK, Maurya SK, Subramanian S, Behera A, Dahiya D, **Agrewala JN**, Mayilraj S.

50 **Frontiers Microbiol**. 7:2016:328 [IF: 6.1]. Innate immunity holding the flanks until reinforced by adaptive immunity against *Mycobacterium tuberculosis* infection. Khan N, Vidyarthi A, Javed S, **Agrewala JN**.

51 **Scientific Reports** 6:2016:19084 [IF: 5.6]. Signaling through NOD-2 and TLR-4 Bolsters the T cell Priming Capability of Dendritic cells by Inducing Autophagy. Khan N, Vidyarthi A, Pahari S, Negi S, Aqdas M, Nadeem S, Agnihotri T, **Agrewala JN**.

52 **Crit Rev Microbiol**. 4:2015:389 [IF: 8.192]. Challenges and Solutions for a Rational Vaccine Design for TB-endemic Regions. Gowthaman U, Mushtaq K, Tan AC, Rai PK, Jackson DC, **Agrewala JN**.

53 **Scientific Reports** 5:2015:15396. [IF: 5.6]. Caerulomycin A inhibits Th2 cell activity and secretion of IgE: a possible role in the management of asthma. Kujur W, Gurram RK, Haleem N, Maurya SK, **Agrewala JN**.

54 **J Innate Immunity** 2015 Nov 28 [IF: 7.4]. 2015. NOD-2 and TLR-4 signaling reinforce dendritic cells efficacy and reduce dose of TB drugs against *Mycobacterium tuberculosis.* Khan N, Pahari S, Vidyarthi A, Aqdas M, **Agrewala JN**.

55 **Frontiers Microbiol**. 6:2015:351. [IF: 5.64]. Rv2031c of *Mycobacterium tuberculosis*: a master regulator of Rv2028-Rv2031 (HspX) operon. Mushtaq K, Sheikh JA, Amir M, Khan N, Singh BV, **Agrewala JN.**

56 **Proteins** 2015 Jul 27. [IF: 4.6]. Probing protease sensitivity of recombinant human erythropoietin reveals α3-α4 inter-helical loop as a stability determinant. Samuel JS, Kumar D, Chodisetti SB, **Agrewala JN**, Singh B, Guptasarma P, Sarkar D.

57 **Clin Exp Immunol**. 18:2015:286. [IF: 5.73]. Prime-boost vaccination strategy with BCG and liposomized-Acr1 reinvigorates BCG potency. Siddiqui KF, Amir M, Khan N, Krishna GR, Sheikh JA, Rajagopal K, **Agrewala JN**.

58 **Int Rev Immunol**. 5:2015:386. [IF: 5.3] Distinct strategies employed by dendritic cells and macrophages in controlling *M. tuberculosis* infection: different philosophies but same desire. Khan N, Vidyarthi A, Pahari S, **Agrewala JN**.

59 **J Infect Dis**. 211:2015: 486-96 [IF: 7.8]. Triggering through TLR-2 limits chronically stimulated Th1 cells from undergoing exhaustion. Chodisetti SB, Gowthaman U, Rai PK, Vidyarthi A, Khan N, **Agrewala JN**.

60 **PLoS One**. 9:2014:E107051. [IF: 4.1]. Caerulomycin A inhibits T cell response to suppress immunity. Singla AK, Gurram RK, Chauhan A, Khatri N, Vohra RM, Jolly RS, **Agrewala JN**.

61 **J Biol Chem.** 289:2014:17515-28 [IF: 4.8]. Caerulomycin A enhances the TGF-β-Smad3 signalling by suppressing IFN-γ-STAT1 signalling to expand Tregs. Gurram RK, Kujur W, Maurya SK, **Agrewala JN.**

62 **J Infect Dis.** 209:2014:1436-45 [IF: 7.8]. Latency Associated Protein Acr1 Impairs Dendritic Cells Maturation and Functionality: A Possible Mechanism of Immune Evasion by *Mycobacterium tuberculosis.* Siddiqui KF, Amir M, Gurram RK, Khan N, Arora A, K Rajagopal, **Agrewala JN**.

63 **Transplantation** 97:2014:e57-9 [IF: 4.94]. Caerulomycin A: a potent novel immunosuppressive agent. Singla AK, Gurram RK, Chauhan A, Khatri N, Vohra RM, Jolly RS, **Agrewala JN**.

64 **Gut Pathog**. 6:2014:28. [IF: 5.3]. Genome sequencing, annotation and comparative genomic analysis of Shigella dysenteriae strain SD1D. Kaur G, Sathyabama S, Arora A, Verma S, Mubin N, **Agrewala JN**, Mayilraj S.

65 **Gut Pathog**. 6:2014:8. [IF: 5.3]. Genome sequencing, annotation and analysis of Salmonella enterica sub species salamae strain DMA-1. Sathyabama S, Kaur G, Arora A, Verma S, Mubin N, Mayilraj S, **Agrewala JN**.

66 **Amino Acids** 46:2014:1265-74. [IF: 4.2]. Decision making critical amino acids: role in designing peptide vaccines for eliciting Th1 and Th2 immune response. Mushtaq K, Chodisetti SB, Rai PK, Maurya SK, Amir M, Sheikh J, **Agrewala JN**.

67 **Crit Rev Microbiol**. 40:2014:273-280. [IF: 8.192]. Friendly Pathogens: Prevent or Provoke Autoimmunity. Sathybama S, Khan N, **Agrewala JN**.

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70 **PLoS One** 8:2013:e54392. [IF: 4.2]. Combinatorial signaling through TLR-2 and CD86 augments activation and differentiation of resting B cells. Jain S, Chodisetti SB, **Agrewala JN.**

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PATENTS

SN	NF No.	Country	Title	Inventors	Prov. Dt.	Comp. Dt	App. No.	Status	Grant date	Patent No.
1	0169NF2001	India	A process for the preparation of a vaccine against tuberculosis and other intracellular pathogens	Javed Naim Agrewala, Naresh Sharma	……	28/08/2003	01372DELNP2003	IF/2014	22/09/2006	199821
	0169NF2001	WIPO (World Intellectual Prop Org)	The vaccine for the treatment of tuberculosis and other intracellular infectious diseases	Javed Naim Agrewala, Naresh Sharma	……	23/03/2001	PCT/IN01/00047	PCT	……	……
	0169NF2001	United States of America	Process for the preparation of a vaccine for the treatment of tuberculosis and other intracellular infectious diseases and the vaccine produced by the process	Javed Naim Agrewala, Naresh Sharma	……	23/03/2001	09/815602	IF	31/08/2004	6783765
	0169NF2001	Thailand	The vaccine for the treatment of tuberculosis and other intracellular infectious diseases	Javed Naim Agrewala, Naresh Sharma	……	26/03/2002	72619	PP	……	……
	0169NF2001	Philippines	The vaccine for the treatment of tuberculosis and other intracellular infectious diseases	Javed Naim Agrewala, Naresh Sharma	……	26/03/2002	1-2002-000229	IF	21/12/2007	1-2002-000229
	0169NF2001	Bangladesh	The vaccine for the treatment of tuberculosis and other	Javed Naim Agrewala,	……	27/03/2002	57/02	IF	27/03/2004	1003852

			intracellular infectious diseases	Naresh Sharma						
	0169NF2001	Brazil	The vaccine for the treatment of tuberculosis and other intracellular infectious diseases	Javed Naim Agrewala, Naresh Sharma	……	27/03/2002	PI0107058-4	PP	……	……
	0169NF2001	Malaysia	The vaccine for the treatment of tuberculosis and other intracellular infectious diseases	Javed Naim Agrewala, Naresh Sharma	……	27/03/2002	PI 20021087	IF	27/02/2009	MY-137579-A
	0169NF2001	Indonesia	The vaccine for the treatment of tuberculosis and other intracellular infectious diseases	Javed Naim Agrewala, Naresh Sharma	……	28/03/2002	WO020 0200740	IF	23/12/2004	0014887
	0169NF2001	China	The vaccine for the treatment of tuberculosis and other intracellular infectious diseases	Javed Naim Agrewala, Naresh Sharma	……	28/03/2002	01802209.X	IF	10/06/2009	ZL 01802209.X
	0169NF2001	Pakistan	The vaccine for the treatment of tuberculosis and other intracellular infectious diseases	Javed Naim Agrewala, Naresh Sharma	……	28/03/2002	229/2002	IF	28/07/2004	138141
	0169NF2001	Viet Nam	The vaccine for the treatment of tuberculosis and other intracellular infectious diseases	Javed Naim Agrewala, Naresh Sharma	……	02/04/2002	1-2002-00297	IF	25/04/2007	1-0006298-000
2	0307NF2005	India	Use of bipyridine compound Caerulomycin A derivatives and analogs thereof as immunosuppressive agents	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	12/09/2005	29/08/2006	2465DEL2005	PP/UE	……	……
	0307NF2005	South Africa	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	……	08/09/2006	2008/02166	IF	26/08/2009	2008/02166

	0307NF2005	Brazil	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	……	08/09/2006	PI 0616561-3	PP	……	……
	0307NF2005	Japan	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	……	08/09/2006	2008-529709	IF	26/04/2013	5254017
	0307NF2005	Korea	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	……	11/03/2008	2008-7005988	IF	20/05/2014	10-1399483
	0307NF2005	WIPO (World Intellectual Prop Org)	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	……	08/09/2006	PCT/IB06/02468	PCT	……	……
	0307NF2005	United States of America	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	……	12/09/2006	11/519200	IF	14/2/2012	8114895
	0307NF2005	European Patent Office	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	……	12/03/2008	06808832.7	EP/IF	03/06/2015	1942889

	0307NF2005	Germany	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	---	03-Jun-15	6808832,7	IF/EP DESIG.	03-Jun-15	1942889
	0307NF2005	France	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	---	03-Jun-15	6808832,7	IF/EP DESIG.	03-Jun-15	1942889
	0307NF2005	Great Britain	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	---	03-Jun-15	6808832,7	IF/EP DESIG.	03-Jun-15	1942889
	0307NF2005	China	Caerulomycin A as an immuno-suppressive agent	Arvind Singla, Javed Naim Agrewala, Rakesh Vohra, Ravindra S Jolly	……	14/04/2008	200680038094.5	IF	04/04/2012	200680038094.5
3	0067NF2009	India	Targeting promiscuous peptides to dendritic cells for generating long-lasting immunity and development of vaccines	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng	14/09/2010	14/09/2011	2172DEL2010	PP	……	……
	0067NF2009	WIPO (World Intellectual Prop Org)	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng	……	14/09/2011	PCT/IN2011/000630	PCT	……	WO/2012/035558
	0067NF2009	Argentina	A synthetic immunogen useful for	Javed Naim Agrewala,	……	14/09/2011	20110103339	PP	……	……

			generating long lasting immunity and protection against pathogens	Uthaman Gowthaman, David Jackson, Weiguang Zeng						
	0067NF2009	Bangladesh	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng	……	14/09/2011	206/2011	PP	……	……
	0067NF2009	Pakistan	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	JAVED NAIM Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng	……	14/09/2011	666/2011	PP	……	……
	0067NF2009	Indonesia	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		12/04/2013	W-00201301531	IF	11-Apr-16	IDP000040873
	0067NF2009	China	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		14/05/2013	201180054827,5	PP		
	0067NF2009	Australia	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		11/03/2013	2011303430	IF	08/01/2015	2011303430
	0067NF2009	South Africa	A synthetic immunogen useful for	Javed Naim Agrewala,		11/03/2013	2013/01831	PP		

			generating long lasting immunity and protection against pathogens	Uthaman Gowthaman, David Jackson, Weiguang Zeng						
	0067NF2009	Brazil	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		13/03/2013	BR1120130059700-2	PP		
	0067NF2009	Japan	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		13/03/2013	2013-528835	IF	26-Aug-16	5991976
	0067NF2009	Europe	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		19/03/2013	11774113,2	TO/EP/NP/IF	20/04/2016	2616098
	0067NF2009	Great Britain	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		19/03/2013	11774113,2	IF/EP DESIG.	20/04/2016	2616098
	0067NF2009	Germany	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		19/03/2013	11774113,2	IF/EP DESIG.	20/04/2016	2616098
	0067NF2009	France	A synthetic immunogen useful for generating long lasting immunity and	Javed Naim Agrewala, Uthaman Gowthaman,		19/03/2013	11774113,2	IF/EP DESIG.	20/04/2016	2616098

			protection against pathogens	David Jackson, Weiguang Zeng						
	0067NF2009	Italy	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		19/03/2013	11774113,2	IF/EP DESIG.	20/04/2016	2616098
	0067NF2009	USA	A synthetic immunogen useful for generating long lasting immunity and protection against pathogens	Javed Naim Agrewala, Uthaman Gowthaman, David Jackson, Weiguang Zeng		13/03/2013	13/822881	IF	17/05/2016	9340622
4	0173NF2013	India	Erythropoietin variants with increased protease resistance	Sarkar Dibyendu, Samuel Jesse Sebastian, Agrewala Javed Naim, Chodisetti Sathi Babu	17/08/2013	15/10/2014	2403DEL2013	PP		

Brief summary of patents

1. **Agrewala J**N, Sharma N. Process for the preparation of a vaccine for the treatment of tuberculosis and other intracellular infectious diseases and the vaccine produced by the process [2004]. **United States Patent No. 6,783,765,** South Africa Patent No. 2002/2511, Russian and Bangladesh Patent No. 1003852.

2. Singla AK, **Agrewala JN**, Vohra RM, Jolly RS. Caerulomycin A as an immunosuppressive agent. **United States Patent No. 8,114,895,** China (CN101287465), PCT (WO2007031832), February 14, 2012.

3. **Agrewala JN**, Gowthaman U, Jackson D, Zeng W. Synthetic immunogen useful for generating long-lasting immunity and protection against pathogens. United States Patent No. 9340622, granted on 17/05/2016; India Patent No. 318504, granted on 20/08/2019; Australia Patent No. 2011303430 granted on 08/01/2015; China patent No. ZL201180054827.5, granted on: 24/02/2016; Germany Patent No. 2616098, granted on 20/04/2016, European patent No. 2616098, granted on 20/04/2016; Indonesia patent No. IDP000040873, granted on 11/04/2016; Japan patent No. 5991976 granted on 26/08/2016.

4. Sarkar D, Samuel JS, **Agrewala JN**, SB Chodsetti. rHuEpo variants with altered in vitro and in vivo properties. Indian Patent Application No. 2403DEL2013; filing date: 17/10/2013.

5. **Agrewala JN** and Nanda S. A novel chimeric vaccine against addiction and tuberculosis infection and method of preparing the novel chimeric vaccine. [Patent application No. 202311081474, filing date: 30/11/2023].

6. **Agrewala JN** and Zafar MA. Rapamycin-induced autophagy bolsters the generation of MOG-reactive protective Tregs by suppressing pathogenic Th17 cells: a prophylactic and therapeutic remedy for averting autoimmune diseases [Patent application No. 202311084966, filing date: 13.12.2023].

TECHNOLOGY

Caerulomycin A as an immunosuppressive agent [United States Patent No. 8,114,895]. Licensed a technology on immunosuppressive molecule for **3 million US dollars** [INR 24 crore] to the Nostrum Pharma, USA on February 15, 2009.

BOOKS/CHAPTERS

1. Tuberculosis vaccine: past experiences and future prospects. Gurpreet Kaur, Deepjyoti K Das, Sanpreet Singh, Junaid Khan, Mohammad Sajid, Hilal Bashir, Mohammad Aqdas, Shikha Negi, Uthaman Gowthaman, Javed N Agrewala. Mycobacterium Tuberculosis: Molecular Infection Biology, Pathogenesis, Diagnostics and New Interventions. Editors: Hasnain, Seyed Ehtesham, Ehtesham, Nasreen Z, Grover, Sonam (Eds.). 2019, Springer, New York

2. Cancer and Infectious Diseases Modern approaches of treatment: Reverse costimulation: A new hope for Tuberculosis and Cancer patients Jun 10, 2013 by Manzoor Ahmad Mir, Raid S. Albaradie, Javed N. Agrewala. (Eds) LAP LAMBERT Academic Publishing GmbH & Co, Germany.

3. Mir MA, Agrewala JN. Influence of immunomodulation of CD80 and CD86 costimulatory molecules in the infectious diseases. Proc on Biotech Approach to Neuro-immunomodulation and Infectious Diseases 2008, vol. 2 Pp 413-424.

4. Mir MA, Agrewala JN. Dietary polyphenols in modulation of the immune system. 2007. Polyphenols and Health: New and Recent Advances. N. Vassallo [eds], Nova Science Publishers. New York.

5. Agrewala JN. Antigen presentation and memory. Immunotherapeutics and disease management [2005]. Proceedings of 12th Annual Symposium, Ranbaxy Science Foundation pp15-22. New Delhi, Nov 2005.

6. Swain SL, Agrewala JN, Brown DM. Regulation of memory CD4 T cells: Generation, localization and persistence [2002]. Lymphocyte Activation and Immune Regulation IX - Homeostasis Lymphocyte Traffic pp. 113-120. S. Gupta, E. Butcher, and W. Paul [eds], Kluwer Academic/Plenum Publishers, New York.

7. Ghei SK, Sengupta U, Agrewala JN, Kailash S, Gunasekharan N, Sudhakar KS, Desikan KV, Shepard CC, Shinnick T. 1996. Association of HLA antigens with leprosy, p. 273-278. In Singh, J. [eds], Current Concepts in Human Genetics. Guru Nanak Dev University, Amritsar.

Research Experience: 35 years
Postdoctoral fellows mentored: 16
PhD students supervised: 35
PhD students [Co-supervised]: 04
Project Fellow supervised: 30
Current PhD students: 05
M Tech students supervised: 04

AREA OF INTEREST

Exploring the interplay between gut microbiota and disease susceptibility. Our recent research endeavours have unveiled profound insights into the interplay between age-related shifts in gut microbiota composition and the compromise of dendritic cell tolerance [*Aging Cell 2023, Gut Microbiome 2023*]. This pivotal connection emphasizes the implications of gut microbiota dysbiosis, extending beyond digestive health to impact immune system function. Remarkably, our investigations have not only illuminated the susceptibility to tuberculosis induced by gut microbiota alterations but have also revealed a novel mechanism of defense. Specifically, we have uncovered how these alterations trigger mincle-mediated activation of lung dendritic cells, providing a protective shield against *Mycobacterium tuberculosis* invasion [*Front Immunol. 2016, Front Immunol. 2019*]. Such findings emphasize the multifaceted roles of gut microbiota in modulating immune responses, influencing both disease susceptibility and protective mechanisms. Furthermore, our studies have explored another dimension of this relationship by elucidating how disruptions in the intestinal microbiota compromise the efficacy of isoniazid-mediated clearance of *Mycobacterium tuberculosis* in murine models [*Eur J Immunol. 2020*]. These observations feature the critical influence of gut microbiota composition on the effectiveness of therapeutic interventions against infectious diseases. Expanding upon these discoveries, emerging evidence suggests a potential role for the gut microbiota in shaping innate immune memory and conferring vital protection against autoimmune diseases [*Front Immunol. 2019, Crit Rev Microbiol. 2014*]. Such revelations open new avenues for understanding the balance between microbial communities within the gut and the immune system's ability to mount effective responses against pathogens while preventing autoimmunity. Through our interconnected discoveries, we aspire to decode the relationship between gut microbiota, immune responses, and disease susceptibility. By unravelling these complexities, we aim to pave the way for innovative therapeutic interventions aimed at harnessing the power of the gut microbiota to enhance immune function and combat aging and a range of diseases.

Exploiting microbes for human welfare. Our group has been trying to identify the impact of microbes isolated from the environment of different niches of India and the gut and other organs of human beings for immunosuppressive, anti-TB and anti-cancer activities. In past, we have discovered the role of 'Caerulomycin A' secreted by the novel species of actinomycetes *Actinoalloteichus spitiensis* in improving the acceptance of skin allografts in the experimental

model of transplantation. The technology was developed and licensed for 3 million US dollars [INR 24 crore] to Nostrum, a USA-based Pharma Company on February 15, 2009 [*United States Patent No. 8,114,895; Transplantation 2014, PloS One 2014*]. Further, we have shown a therapeutic role of Caerulomycin A in the regression of asthma symptoms [*Scientific Report 2015*]. Importantly, the mechanism of action involved was through enhancement in the TGF-β-Smad3 protein signaling by suppressing IFN-γ-STAT1 protein signaling to expand regulatory T cells. [*J Biol Chem. 2014*].

Reinvigorating drug potency through immunomodulation. Diseases like tuberculosis, cancer, diabetes, malaria, etc., not only contribute to death but the patients suffering from these diseases are also inflicted with devastating side effects and toxicity of long-term drug regimes. Thus, it accentuates an urgent need to introduce radical changes in the current drug regime and explore newer and safer treatment methods. Recently, an improved understanding of host-pathogen interaction has opened new avenues for disease treatment through immunotherapy [*J Infect Dis. 2014, J Infect Dis. 2015*]. This emboldens us to devise a novel strategy of bolstering host immunity by delivering signals through molecules of innate and adaptive immunity; thereby reinforcing the efficacy of drugs to kill the etiological agents of the disease. This novel approach induces significant enhancement in the host immunity and thus reduces the dose and duration of the drug. Further, it reinvigorates drug potency and reduces the emergence of drug resistance. Importantly, this adjunct stratagem employing immunomodulators and drugs would have a promising therapeutic impact in future in controlling diseases.

Development of novel strategies for vaccination against tuberculosis. We have demonstrated a novel and simple vaccination strategy that involves the culturing of live *Mycobacterium tuberculosis* and *Salmonella typhimurium* in macrophages, followed by drug treatment and gamma irradiation, to kill the bacteria. This approach worked successfully not only for tuberculosis but also showed a significant decrease in mortality of mice challenged with live *S. typhimurium* [*J Infect Dis. 2004, US Patent 6783765, 2004*]. We have also shown that administration of IL-7 and IL-15 with BCG resulted in an enduring CD4 and CD8 T cell memory response. Mice injected with BCG supplemented with IL-7 and IL-15 displayed enhanced T cell proliferation, Th1–type cytokine production, and an increased pool of

multifunctional *M. tuberculosis*–specific memory T cells. There was a significant reduction in the mycobacterial burden in the lungs. The results indicate that supplementation of the BCG vaccine with IL-7 and IL-15 would substantially improve its efficacy by enhancing the T cell memory response [J Infect Dis. 2010]. We have also studied the role of T cell memory augmenting cytokines IL-1+IL-6+TNF-α in the induction of the enhancement of long-term protection by the vaccine prepared by utilizing infected macrophages. We observed the long-term generation of memory T cells, expansion of both central and effector memory CD4 and CD8 T cell pools, elicitation of mainly Th1 memory response, reduction in the mycobacterial load and alleviated lung pathology. Importantly, the protection induced by the vaccine was significantly better than BCG [*PLoS One 2011*]. We have also developed a novel vaccine using lipopeptide [L91] by linking the promiscuous peptide [sequence 91-110] of 16 kDa antigen of *M. tuberculosis* to Pam2Cys. L91 does not require extensive antigen processing and generates enduring Th1 memory response. This is evidenced by the fact that L91 significantly improved the activation, proliferation and generation of protective T cells. This peptide has self-adjuvanting properties and can be a potent future vaccine candidate against tuberculosis [J Biol Chem. 2022, *J Infect Dis. 2011, Trends Mol Med 2012, PloS Pathogens 2012, Crit Rev Microbiol 2014*]. We also explored the possibility of employing bioinformatics tools for predicting peptides as potential vaccine candidates [*J Proteome Res. 2008, Expert Rev Proteomics 2009, Amino Acids 2010, BMC Immunol. 2012, Amino Acids 2014*].

Host-directed therapies. Host-directed therapies are gaining considerable impetus following the observation of the emergence of drug-resistant strains of pathogens due to antibiotic therapy. We are trying to bolster host immunity against pathogens by signaling through the molecules of innate and adaptive immunity. We have demonstrated triggering macrophages through Clec4 can restrict the survival of *Mtb* by activating the autophagy pathway [*Autophagy 2020*]. Similarly, we observed that curdlan. Activation of lung DCs by mincle can restrict the growth of *Mtb* [*Front Immunol. 2019*]. We have discovered the role of CD80 in inducing the apoptosis in B cell lymphoma by up-regulating the expression of pro-apoptotic molecules caspase-3, caspase-8, Fas, FasL, Bak, and Bax and down-regulating the levels of anti-apoptotic molecule Bcl-x[L] [*J Biol Chem. 2002, Expert Opin Ther Targets 2008, Curr Immunol Rev. 2007, PLoS Pathogens 2012*]. We also demonstrated, for the first time, that distinct regulatory mechanism

operates in macrophages and B cells for delivering costimulatory signals to T cells [*J Immunol. 1998*]. Our work has ascertained the potential role of B7-1 and CD28 costimulatory molecules in immunosuppression in leprosy patients [*Clin Exp Immunol. 1998*]. Our work revealed that resveratrol and curcumin suppress immune response through CD28/CTLA-4 and CD80 costimulatory pathway [*Clin Exp Immunol. 2007*]. Our study also infers that immunization with antigen along with costimulatory molecules may significantly reduce the dose of antigen and can generate a better immune response than antigen alone [*BMC Immunol. 2006*].

TEACHING EXPERIENCE

PhD students: 35 years

Postgraduate students:35 years

Graduate students: 6 years

VISITS ABROAD

	Country	Year	Purpose
1	South Africa	2023	Presented a paper at the International Congress of Immunology, Cape Town
2	China	2019	Presented a paper at the International Congress of Immunology, Beijing
3	UK	2019	Academic Visit, London
4	Ireland	2019	Academic Visit, Belfast
5	UK	2015	Presented a paper at the World Congress of Infectious Diseases, London
6	Malaysia	2014	Presented a paper at the Clinical Microbiology Conference, Kuala Lumpur
7	Italy	2013	Presented a paper, Immunology Congress, Milan
8	China	2012	Presented a paper, Vaccine Congress, Shanghai
9	France	2012	Presented a paper, Tuberculosis Conference, Paris
10	Australia	2012	Visited collaborator Prof D. Jackson and delivered a lecture at the University of Melbourne
11	Australia	2012	Invited lecture at the University of Sydney
12	USA	2011	Presented a paper at the American Association of Immunologists Conference, San Francisco
13	Dubai	2011	Presented a paper, International Conference on Drug Discovery and Therapy, Dubai
14	Singapore	2009	Presented a paper, Vaccine Congress, Singapore

15	USA	2009	To attend the Controlling Laboratory Biorisks Training Course, Albuquerque
16	USA	2008	To attend BSL3 Science and Safety Training Program, Atlanta
17	USA	2008	To attend CDCs 10th International Symposium on Biosafety, Atlanta
18	Iran	2005	Invited lecture, International Congress of Biochemistry and Molecular Biology, Tehran, Iran
19	Kuwait	2002	Invited lecture, Department of Microbiology and Immunology, Health Science Center, Kuwait
20	Denmark	2002	Invited lecture, Staten Serum Institute, Copenhagen
21	USA	2001-02	Visiting Scientist, Trudeau Institute, Saranac Lake
22	Japan	2000	Presented a paper, The CREST Symposium, Sandai
23	UK	1994-96	Visiting Scientist, Hammersmith Hospital, London

ADMINISTRATIVE EXPERIENCE

1. Thirty-five years of experience of administration in successfully running the laboratory and handling research scholars, project assistants, research associates and technical staff.
2. Fifteen years of experience in efficaciously running, managing and maintaining a central facility of P-3 and BSL-3 laboratories, which was used by several scientists, research scholars and technical staff of the institute. I was also involved in the construction and functioning of the new BSL-3 facility of the institute.
3. Three-year experience in efficiently managing and maintaining Experimental Animal Facility of the institute. I was also involved in the modernization of the facility. The facility became self-dependent during my tenure and no animals were procured from other sources. The facility also catered the need of different institutes, universities, colleges, pharma industries, etc., and earned the external cash revenue. Several scientists of the institute used the facility.
4. Member of several inter and intra-institutional committees.

MEMBER of COMMITTEES

1. Selection Committee: Technicians, 1991. IMTECH, Chandigarh
2. Selection Committee: Technical Assistants, 1992. IMTECH, Chandigarh
3. Selection & Assessment Committee: Scientists, 1997. Centre for Biotechnology, Delhi
4. Board of studies in Human Genomics. 2005. Panjab University, Chandigarh
5. Selection & Assessment Committee: Scientists, 2004-2009. IIIM, Jammu
6. Task Force Committee-ICMR. New Delhi [2006-11]
7. Technical Committee-ICMR. New Delhi [2006-11]
8. In-charge BSL3, IMTECH-CSIR [2006-12]
9. Biosafety Officer, CSIR-IMTECH [2007-12]
10. Selection Committee: Scientists, 2008. IMTECH, Chandigarh
11. Selection Committee: Technicians, 2008. IMTECH, Chandigarh
12. CSIR committee for minimization of animal use. 2008. CSIR, New Delhi
13. Institute's Animal Ethics Committee, IMTECH, Chandigarh
14. Science Coordination Committee. Open Source Drug Discovery [OSDD], 2009.
15. Selection Committee-Engineers-2008. IMTECH
16. Expert Member: Selection Committee of Scientists, 2009. IMTECH, Chandigarh
17. Expert Member-Selection Committee [2009]: M. Pharma, Jamia Hamdard, New Delhi
18. NMITLI-IOP Screening Committee [2009]-CSIR, New Delhi
19. NMITLI-Vaccine Development [2009-2011], CSIR, New Delhi
20. Shanti Swarup Bhatnagar Advisory Committee-Medical Sciences-2009
21. Expert Member [Biomedicine]: Indo-Hungarian bilateral program-2009
22. Selection Committee: CSIR-Nehru Science Postdoctoral Research Fellowship-2009
23. Committee to oversee Publications and Patentability-2010.
24. Group Leader [Health Care]: CSIR Technofest-2010
25. Research Degree Committee [Biotechnology], Panjab University, Chandigarh-2010-2011
26. Board Nominee: Academy of Scientific and Innovative Research [AcSIR]-2010

27. Shanti Swarup Bhatnagar Advisory Committee-Medical Sciences-2010
28. Management Committee, IMTECH, Chandigarh-2010, 2011
29. Selection Committee, Hamdard University, New Delhi-2011
30. Revised Performance Appraisal System for CSIR Scientists-2011
31. Filling up of Vacant Scientific and Technical posts at IMTECH-2011
32. Committee of selection of CSIR SRF/RA-2011
33. Use/misuse of instruments in various laboratories-2011
34. Selection committee for the engagement of part time lady doctor-2011
35. Selection Committee of Scientists: Indian Institute of Petroleum, Dehradun-2011
36. Assessment Committee of Scientists: National Institute of Immunology, New Delhi [2011]
37. Board of Studies. Hamdard University, New Delhi-2011
38. Shanti Swarup Bhatnagar Advisory Committee-Medical Sciences-2011
39. DST-INSPIRE Program-2012
40. University of Kashmir, INSPIRE Expert for Life Sciences
41. DBT-Expert Member online eProMIS System
42. CSIR-EMPOWER Committee [2012]
43. Board Member- Academy of Scientific and Innovative Research [AcSIR]
44. DBT Nominee for Institutional Biosafety Committee, NIPER, Mohali
45. DBT Nominee for Institutional Biosafety Committee for PanEra Biotech Pvt Ltd, Lalru [2012, 2013]
46. Member-Intellectual Property Cell, IMTECH
47. CSIR-Nehru Science Postdoctoral Research Fellowship Schemes [2012]
48. DBT-Task force committee in tuberculosis [2012]
49. CSIR-IGIB: Member screening committee scientists (Group IV) [2013]
50. NMITLI-Vaccine Development [2013], CSIR, New Delhi
51. Selection committee: Project fellows/Senior Research Fellows. CSIO, Chandigarh [2013]
52. Selection committee: CSIR-Nehru Science Postdoctoral Research Fellowship [2013]
53. Recruitment & Assessment Board, Biosciences & Biotechnology, CSIR, New Delhi, 2013
54. Board of Studies, Faculty of Agricultural Sciences, AMU, Aligarh, 2013
55. Tuberculosis Consortium India, AIIMS, New Delhi-2014
56. DBT-ICMR HIV cohort study-2014
57. Selection committee: CSIR-Nehru Science Postdoctoral Research Fellowship [2014]
58. Assessment Committee, CDRI, Lucknow-2014
59. ICMR task force committee on Laptospirosis-2014
60. Selection committee: Project fellows/Senior Research Fellows. CSIO, Chandigarh [2014]
61. Member Selection Committee, Assistant Professor, DAV University, Jalandhar [2014]
62. Member: Standing Committee for Bhagyatara Award 2014, 2015
63. Research Degree Committee, Biotechnology Engineering, Panjab University [2014-15]
64. DBT-ICMR HIV cohort study-2015
65. Chairman Selection Committee: Project fellows/Senior Research Fellows. CSIO, Chandigarh [2015]
66. Selection Committee: CSIR-Nehru Science Postdoctoral Research Fellowship [2015]
67. Selection Committee 2015: Associate Professors, Microbial Technology, Panjab University, Chandigarh
68. Board of Postgraduate Studies in Zoology, Panjab University, Chandigarh [2015-17]
69. Standing Committee for Bhagyatara Award, Panjab University, Chandigarh [2015]
70. Assessment Committee, CDRI, Lucknow-2015
71. Screening Committee for selection for Scientists and Senior Scientists, CSIR-IICB, Kolkatta [2015]
72. Selection Committee, DST-INSPIRE Faculty, Panjab University, Chandigarh [2015]
73. Selection Committee for Associate Professors, Panjab University, Chandigarh [2015]
74. Selection Committee for Professors, Associate Professors and Assistant Professors, Central University Panjab, Bhatinda [2015]
75. Chairman: Publications and Patents, CSIR-IMTECH [2015].
76. Collegium to evaluate assessment of Senior Principal Scientists, CSIR-IMTECH [2015]
77. Shanti Swarup Bhatnagar Advisory Committee-Medical Sciences-2015
78. Collegium to evaluate assessment of Senior Principal Scientists, CSIR-IMTECH [2016]
79. SRF assessment committee, Indian Institute of Integrative Medicine [2016]
80. SRF assessment committee, Jammu University [2016]
81. SRF assessment committee, Indian Institute of Science Education and Research (IISER), Mohali [2016]
82. Assessment committee of Associate Professor, Jamia Millia Islamia, New Delhi
83. Selection committee of Assistant Professors: Indian Institute of Technology (IIT), Ropar [2016]
84. Member: Standing Committee for Bhagyatara Award [2017]
85. Selection Committee: DST-Inspire Fellowship [2017]
86. Chief Guest: Communicable and non-communicable diseases: latest therapeutic interventions, Panjab University [2017]
87. DBT Nominee: Biosafety Committee [2017]
88. Selection Committee: CSIR-Nehru Science Postdoctoral Research Fellowship, CSIR, New Delhi [2017]
89. Selection committee of Scientists: Central Food Technology Research Institute, Mysore [2017]
90. Selection committee of Scientists: Central Drug Research Institute, Lucknow [2017]
91. Selection committee: Bhagyatara Award [2017]
92. Selection committee: INSA Young Scientist Award [2018]
93. Selection committee: Bhagyatara Award [2018]
94. Selection committee: INSA Fellows [2018]
95. Task Force Committee: Human Microbiome, Department of Biotechnology, New Delhi [2018]
96. Task Force Committee: Vaccines, DBT, New Delhi [2018]

97. Task Force Committee: Leptospirosis and its control, ICMR, New Delhi [2018]
98. Selection Committee: Professor, Associate Prof and Assistant Prof, Central University of Punjab, Bhatinda [2019]
99. Selection Committee: Professor, Associate Prof and Assistant Prof, Sant Longowal Institute of Engineering & Technology, [2019]
100. Member: Board of Studies, Central University of Punjab, Bhatinda, [2019-2021]
101. Selection Committee: DST Swarna Jayanti Fellowship, Subject Area Committee (SAC) in the area of Life Sciences, 2021.
102. Member: Selection Committee for recruiting Assistant Professors at the Amity University, Mohali [2021].
103. Expert: Bioengineering program. Indian Institute of Information Technology Design and Manufacturing (IIITDM) Kancheepuram-Chennai, 2022.
104. Research Advisory Committee, Integral University, Lucknow [2022].
105. Selection Committee of Associate Professors, AIIMS, New Delhi [2022].
106. Research Advisory Committee, National AIDS Research Institute, Pune [2023].
107. Selection Committee of CSIR for recruitment of Senior Research Fellows and Research Associates [2024].
108. Grant Review Committee of CSIR-ASPIRE [2024].
109. Grant review Committee of ICMR Intramural Expert PSC-I for Communicable Diseases & Epidemiology [2024].

GRANTS AND PROJECTS

SN	Project Title	Funding Agency	Budget [*INR in lacs*]	Duration
1.	Understanding the costimulatory mechanism of 150kDa [*M150*] membrane protein of macrophages in the differentiation of naive T cells into *Th1* and *Th2* subtypes and in the augmentation of cell mediated immunity in experimental *tuberculosis [Project Leader]*	DBT	27.00	1996-1999
2.	Targeting *M. tuberculosis* entrapped in MHC-mismatched macrophages to dendritic cells: approach for the induction of tuberculosis specific protective immunity [NIF Award] *[Project Leader]*	CSIR	10.00	1999-2002
3.	Understanding the costimulatory mechanism of 150kDa [*M150*] membrane protein of macrophages in the activation of effector T cells *[Project Leader]*	CSIR	6.00	1999-2002
4.	Costimulatory molecules mediated regulation of the activation and differentiation of antigen presenting cells *[Project Leader]*	CSIR	10.00	2002-2005
5.	Potent role of pro-memory cytokines in the protection and generation and sustenance of memory responses in animals immunized with vaccine prepared from macrophages infected with live *M. tuberculosis [Project Leader]*	ICMR	25.00	2006-2009
6.	Develop vaccine against tuberculosis *[Project Leader]*	DBT	9.00	2006-2009
7.	Potent role of vaccines prepared from macrophages infected with live bacteria in the protection and generation of long-lasting memory cells against *Mycobacterium tuberculosis*	DBT	54.00	2006-2009
8.	Targeting Promiscuous Peptides to Dendritic Cells through Toll like Receptor-2 and Elicitation of Effective Immunity against *Mycobacterium tuberculosis [Project Leader]*	CSIR	55.00	2007-2012
9.	DBT sponsored program support on R & D of therapeutic proteins [*co-investigator]*	DBT	450.00	2006-2009
10.	Understanding the molecular mechanism of diseases of national priority: developing novel therapeutic approaches [*co-investigator*]	CSIR	250.00	2008-2013
11.	Exploration and exploitation of microbial diversity of India [*co-investigator*]	CSIR	2500.0	2008-2013
12.	Development of Caerulomycins as Novel Immunosuppressive Agents to Prevent Organ Rejection after Transplantation and to Address Various Auto-immune Disorder *[Project Leader]*	CSIR	410.00	2010-2014
13.	Centre for biotherapeutic molecule discovery *[team member]*	CSIR	4000.0	2012-17
14.	Man as a Superorganism: Understanding the Human Microbiome *[co-investigator]*	CSIR	2600.0	2012-17

15.	Multidirectional approaches for molecular and systems level understanding of regulatory networks in pathogenic microbes *[co-investigator]*	CSIR	2880.0	2012-17
16.	Drug Discovery: Bugs to Drugs Programme *[co-investigator]*	CSIR	1723.00	2012-17
17.	Genomics and Informatics Solutions for Integrating Biology *[co-investigator]*	CSIR	1690.0	2012-17
18.	Management of infectious diseases by immunomodulation *[Project Leader]*	CSIR	750.00	2011-16
19.	Novel Vaccine Delivery Systems that Elicit Robust and Enduring T Cell Memory Responses: Alternatives to BCG Vaccination in Tuberculosis Endemic Regions *[Project Leader]*	Indo-Australia	185.18	2012-16
20.	Synthesis of lipidated promiscuous peptides of *Mycobacterium tuberculosis* under good laboratory practices *[Project Leader]*	CSIR	107.56	2016-18
21.	Enhancement of the immunogenicity and protective efficacy of lipopeptide vaccine against *Mycobacterium tuberculosis* using peptidomimetics and conjugation with isoniazid *[co-investigator]*	DST-SERB	61.52	2017-20
22.	Generation of promiscuous peptides entrapped nanoparticles displaying TLR-2 ligand to impart protective immunity against *Mycobacterium tuberculosis [Project Leader]*	DST-SERB	86.00	2018-2023
23.	Immunotherapeutic and prophylactic remedy against heroin dependency *[Project Leader]*	MHRD	45.00	2018-contd.
24.	Co-administration of rapamycin with MOG peptide and restricting the development of experimental autoimmune encephalomyelitis by skewing Th17 cells to Tregs *[Project Leader]*	SPARC	63.00	2019-contd.
25.	Bolstering BCG efficacy by expressing memory-enhancing cytokines IL-7 and IL-15 to elicit long-lasting memory T cells and protection against Mycobacterium tuberculosis [Project Leader] [Ref No. File No: 5/8/5/17 /ITRC/Vaccine Trail/2022/ECD-1] *[Project Leader]*	ICMR	79.00	2023-contd
26.	Influence of gut microbiota on the generation of enduring memory T cell response *[Project Leader]*	DST-SPARC	84.00	2023-contd