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Jaya S. Tyagi

CURRICULUM VITAE

NAME JAYA SIVASWAMI TYAGI

DESIGNATION
Professor and Head
Department of Biotechnology
All India Institute of Medical Sciences
New Delhi-110029
and
Honorary Professor
Centre for Biodesign & Diagnostics
THSTI, Faridabad, Haryana

CONTACT ADDRESS & DETAILS
Telefax 011-26588491
Tel. 011-26594609,
Email jstyagi@aiims.edu, jayatyagi.aiims@gmail.com

DATE OF BIRTH 19th May 1954 ***SEX*** Female

HONOURS/ AWARDS

- Professor Jyotirmoy Das Memorial Lecture Award
- Stree Shakti Science Samman
- J.C. Bose National Fellowship
- DBT Tata Innovation Fellowship
- Dr. Kona Sampath Kumar Memorial Prize, University of Delhi
- P.S. Sarma Memorial Award
- National Women Bioscientist Award (Young category)
- New Millennium Science Medal, Indian Science Congress
- First position in Biochemistry in Agriculture Research Service (ARS) examination First position in B.Sc., M.Sc.
- National Science Talent Fellow, B.Sc, M.Sc. and Ph.D.

FELLOWSHIPS OF NATIONAL ACADEMIES

- Fellow, Indian National Science Academy (New Delhi)
- Fellow, Indian Academy of Sciences (Bangalore)
- Fellow, National Academy of Sciences of India (Allahabad)

MEMBERSHIPS OF PROFESSIONAL SOCIETIES/ASSOCIATIONS

- Member, Guha Research Conference
- Life member, Society of Biological Chemists (India)
- Life member, Indian Society of Cell Biology
- Life member, Association of Microbiologists of India

EDUCATION

Degree	Year	University	Subject	Division, Rank
B.Sc.	1973	University of Delhi	Science	I, 1st Rank
M.Sc	1975	University of Delhi	Nutrition, Biochemistry	I, 1st Rank
Ph.D.	1979	University of Delhi	Biochemistry	-

POSITIONS AND RESEARCH EXPERIENCE

Duration	Designation	Institution
August 2016 to Present	Professor & Head, Department of Biotechnology	AIIMS, New Delhi
July 2001 to July 2016	Professor, Department of Biotechnology	AIIMS, New Delhi
July 1991 to June 2001	Additional Professor, Department of Biotechnology	AIIMS, New Delhi
June 1987 to June 1991	Associate Professor, Department of Biotechnology	AIIMS, New Delhi
June 1983 to May 1987	Scientist C	Centre for Biochemical Technology, Delhi (renamed as IGIB)
August 1979 to June 1983	Visiting Fellow & Visiting Associate, Laboratory of Molecular Biology	National Cancer Institute, NIH, Bethesda MD, USA
October 1975 to July 1979	Junior Research Fellow & Senior Research Fellow	V.P. Chest Institute, University of Delhi

Public service (present /past services)

Academies
INSA - Member, Council, Sectional Committee IX
Indian Academy of Sciences - Member, Panel of Scientific Values

Member, Scientific Advisory Committees/Special Committee/Ethics Committee of National Institutes/Universities

- RAP/SAC of NIRT, NIP, NCCS, CDFD, NII, Bose Institute
- Special Committee of Special Centre for Molecular Medicine, School of Life Sciences, School of Biotechnology, Jawaharlal Nehru University
- ICMR TB Consortium
- DBT Expert Committee for Star College Scheme
- Governing Body, NII
- Finance Committee and Governing Body, NCCS
- Board of Governors, IIT Roorkee
- Chairperson, Institutional Human Ethics Committee of IGIB

Member, Selection Committee

- Faculty Selection Committee - DST-Inspire Faculty, Institute of Life Sciences, Gautam Buddha University (Screening)
- CSIR Selection Committee of SPM fellowships
- DBT PDF Selection Committee
- Innovation Awardee and Faculty Assessment Committee, THSTI

Manpower training/Curriculum development

- Member, DBT Task Force on Human Resource Development
- Member, BCIL DBT Committee for curriculum development for M.Sc. in Medical Biotechnology and M.Sc. in Molecular and Human Genetics
- Member, UG-PG Board of Studies, Biotechnology School, Pondicherry University
- Member, Training Advisory Committee, NIH Training Programme, Anna University
- Member, UGC Committee for curriculum development in M.Sc. Microbiology

Member of National/International Committees for evaluation /funding/ review of Scientific Research

- Evaluation of Projects in Health Indo-Australia Grand Challenge Programme, Indo-Sweden Research Programme, Fondazione Caprilo Italy, Medical Research Council UK
- Evaluation of Scientists of South Africa National Research Foundation
- Technical Evaluation Board, BIG Scheme, BIRAC
- DBT Expert Committee on Tuberculosis
- DST SERB PAC for Biochemistry, Biophysics, Molecular Biology, Microbiology
- CSIR Animal Science and Biotechnology Research Committee

AIIMS service

Co-ordinator, Central Core Research Facility and BSL-3 BSL-2 laboratories
Member, Dean's Committee for PhD Reforms
Member, Patents Committee
Member, Ethics Committee (PG, Basic Science)
Member, Intramural Research Committee
Member, Scientific Advisory Committee for AIIMS Endowment Fund
CPIO, Department of Biotechnology (RTI)
Chairperson, Institutional Biosafety Committee for Recombinant DNA Research

Other work

Evaluation and Review of Research proposals and Project Reports for various funding agencies
Examiner for M.Sc, M.Phil and Ph. D. theses and M. Biotechnology examination (AIIMS, PGI Chandigarh)

Teaching: 30 years of PG teaching experience of Bacterial Genetics, Molecular Biology, Recombinant DNA Technology subjects in M. Biotechnology and M. Sc. Biochemistry courses at AIIMS.

Training: In faculty training, WHO sponsored candidates, Summer Trainees from Universities and Inter-Academy Summer Fellowship programme (average 2-3 trainees per year).

Research: More than 34 years research experience in Molecular myobacteriology (Molecular biology, Recombinant DNA Technology, Bacterial Genetics). Most notable contributions are (1) Discovery of the DevR-DevS two-component signaling system of Mtb essential for adaptation to hypoxia and entry into dormancy, (2) Establishing proof of concept for DevR as a novel drug target, (3) Development of TB diagnostic technologies, and 4) Development of a novel vitamin C-based model for study of bacterial dormancy, host-pathogen interactions and inhibitor screening in dormant infection setting. Research funding is obtained after competitive peer review of proposals from various agencies of the Govt. of India (DBT, CSIR and DST and ICMR).

Research supervision:

Ph.D. awarded	17
Ph.D. currently working	6
M.Biotechnology awarded	44
M. Biotechnology currently working	2
MD and DM awarded	3
Post-doctoral mentorship	25

Publications and patents.

Citations	3254 (Google Scholar)
h-index	31
i10-index	65

Total: Research papers and Reviews: 91 Book chapters: 6 General articles: 4

List of Research papers only (in decreasing chronological order upto 1990 only)

1. Sikri K, Duggal P, Kumar C, Batra SD, Vashist A, Bhaskar A, Tripathi K**,** Sethi TP, Singh, **Tyagi JS** Multifaceted remodeling by vitamin C boosts sensitivity of *Mycobacterium tuberculosis* subpopulations to combination treatment by anti-tubercular drugs. Redox Biology, Posted online January 3 2018 http://authors.elsevier.com/sd/article/S2213231717308911

2. Lavania S, Anthwal D, Bhalla M, Singh N, Haldar S, **Tyagi JS** (2017) Direct detection of Mycobacterium tuberculosis rifampin resistance in bio-safe stained sputum smears. PLOS ONE, 12(12):e0189149. doi: 10.1371/journal.pone.0189149

3. Tyagi S, Sharma N, **Tyagi JS**, Haldar S. (2017) Challenges in pleural tuberculosis diagnosis: existing reference standards and nucleic acid tests. Future Microbiol. 12:1201-1218. doi: 10.2217/fmb-2017-0028

4. Kumari P*, Sikri K*, Kaur K, Gupta UD, **Tyagi JS** (2017) Sustained expression of DevR/DosR during long-term hypoxic culture of Mycobacterium tuberculosis. Tuberculosis (Edinb). 106:33-37.

5. Batra SD, Nandi M, Sikri K, **Tyagi JS**. (2017) Genome-wide expression profiling establishes novel modulatory roles of vitamin C in THP-1 human monocytic cell line. BMC Genomics 18(1):252. doi: 10.1186/s12864-017-3635-4.

6. Anthwal D, Gupta RK, Bhalla M, Bhatnagar S, **Tyagi JS**, Haldar S. (2017) Direct Detection of Rifampin and Isoniazid Resistance in Sputum Samples from Tuberculosis Patients by High-Resolution Melt Curve Analysis. J Clin Microbiol. 55(6):1755-1766. doi: 10.1128/JCM.02104-16

7. Sharma S, **Tyagi JS** (2016) Mycobacterium tuberculosis DevR/DosR Dormancy Regulator Activation Mechanism: Dispensability of Phosphorylation, Cooperativity and Essentiality of α10 Helix. PLoS ONE 11(8): e0160723. doi:10.1371/journal.pone.0160723

8. Kaur K*, Priyanka Kumari*, Sharma S, Sehgal S, **Tyagi JS** (2016) DevS/DosS sensor is bifunctional and its phosphatase activity precludes aerobic DevR/DosR regulon expression in Mycobacterium tuberculosis. The FEBS Journal 283, 2949–2962

9. Nathan C, Bahr NC, Marais S, Caws M, van Crevel R, Wilkinson R, **Tyagi JS**, Thwaites GE, Boulware DR (2016) GeneXpert MTB/Rif to Diagnose Tuberculous Meningitis: Perhaps the First Test but not the Last. Clinical Infectious Diseases doi:10.1093/cid/ciw083

10. Vashist A, D. Prithvi Raj, Gupta UD, Bhat R, **Tyagi JS** (2016) The α10 helix of DevR, the *Mycobacterium tuberculosis* dormancy response regulator, regulates its DNA binding and activity. The FEBS Journal 283, 1286–1299

11. **Tyagi JS** (2016) The TB battle: How well are we fighting the bug? Nature India, 42-44

12. Sikri K, Batra SD, Nandi M, Kumari P, Taneja NK and **Tyagi JS** (2015) The pleiotropic transcriptional response of Mycobacterium tuberculosis to vitamin C is robust and overlaps with the bacterial response to multiple intracellular stresses. Microbiology 161, 739–753
13. Haldar S & **Tyagi JS** (2014). Bacterial sediments from CSF are not the optimum sample for PCR-based diagnosis of tuberculous meningitis. Comment to article "Diagnostic Accuracy of Quantitative PCR (Xpert MTB/RIF) for Tuberculous Meningitis in a High Burden Setting: A Prospective Study" *PLOS Medicine*
14. Kaur K, Taneja NK, Dhingra S, **Tyagi JS** (2014) DevR (DosR) mimetic peptides impair transcriptional regulation and survival of *Mycobacterium tuberculosis* under hypoxia by inhibiting the autokinase activity of DevS sensor kinase. BMC Microbiology 14:195
15. Gautam US, Sikri K, Vashist A, Singh V, **Tyagi JS** (2014) Essentiality of DevR/DosR interaction with SigA for the dormancy survival program in Mycobacterium tuberculosis. J. Bacteriol. 196:790-799.
16. Sikri K, **Tyagi JS** (2013) The evolution of Mycobacterium tuberculosis dormancy models. Current Science 105:607-616
17. Haldar S, Sankhyan N, Sharma N, Bansal A, Jain V, Gupta VK, Juneja M, Mishra D, Kapil A, Singh UB, Gulati S, Kalra V, **Tyagi JS**. (2012) Detection of Mycobacterium tuberculosis GlcB or HspX Antigens or devR DNA Impacts the Rapid Diagnosis of Tuberculous Meningitis in Children. PLoS ONE 7(9): e44630.
18. Majumdar SD, Vashist A, Dhingra S, Gupta R, Singh A, Challu VK, Ramanathan VD, Kumar P, **Tyagi JS.** (2012) Appropriate DevR (DosR)-Mediated Signaling Determines Transcriptional Response, Hypoxic Viability and Virulence of Mycobacterium tuberculosis PLoS ONE 7(4): e35847.
19. Dhingra S, Kaur K, Taneja NK & **Tyagi JS**. (2012) DevR (DosR) binding peptide inhibits adaptation of Mycobacterium tuberculosis under hypoxia FEMS Microbiol Lett 330: 66–71
20. Gautam US, Sikri K & **Tyagi JS.** (2011) Threonine 82 residue of DevR (DosR) is essential for DevR activation and function in *Mycobacterium tuberculosis* despite its atypical location. J. Bacteriol. 193:4849-4858
21. Haldar S, Bose M, Chakrabarti P, Daginawala HF, Harinath BC, Kashyap RS, Kulkarni S, Majumdar A, Prasad HK, Rodrigues C, Srivastava R, Taori GM, Varma-Basil M & **Tyagi JS.** (2011) Improved laboratory diagnosis of tuberculosis : The Indian experience, Tuberculosis (Edinb) 91(5):414-26
22. Chakraborti PK, Matange N, Nandicoori VK, Singh Y, **Tyagi JS** & Visweswariah SS. (2011) Signalling mechanisms in Mycobacteria Tuberculosis (Edinb). 91(5):432-40
23. Chauhan S, Sharma D, Singh A, Surolia A &**Tyagi JS.** (2011) Comprehensive insights into Mycobacterium tuberculosis DevR (DosR) regulon activation switch. Nucleic Acids Res. 39(17): 7400-7414
24. Kumar M, Malhotra M, Hanif M &**Tyagi JS.** (2011) Exposure of sputum to phenol disinfectant in conjunction with the Universal Sample Processing Solution provides safety to laboratory workers during smear microscopy. J Med Microbiol 60:1410-2
25. Gupta RK, Chauhan S & **Tyagi JS. (**2011) K182G substitution in DevR or C(8) G mutation in the Dev box impairs protein-DNA interaction and abrogates DevR-mediated gene induction in Mycobacterium tuberculosis. FEBS Journal 278: 2131-2139

26. **Tyagi JS.** (2011) Value of Sputum microscopy in TB diagnosis and Mehtods of improving its sensitivity and that of extrapulmonary TB diagnosis. Pg. 164-168 In Proceedings of the Eleventh Sir Dorabji Tata Symposium on Diagnostics in Infections
27. Gautam US, Chauhan S & **Tyagi JS.** (2011) Determinants outside the DevR C-terminal domain are essential for cooperativity and robust activation of dormancy genes in Mycobacterium tuberculosis. PLoS One. 6(1):e16500.
28. Chauhan S & **Tyagi JS** (2011) Analysis of transcription at the *oriC* locus in *Mycobacterium tuberculosis* Microbiol. Res. **166:** 508-514
29. Ray R, Kumar N, Gupta R, Mridha AR, **Tyagi JS** & Kumar AS (2010) Mesothelial/ monocytic incidental cardiac excrescences (MICE) with tubercular aortitis: report of the first case with brief review of the literature. J Clin Pathol. Jul 29. [Epub ahead of print] doi:10.1136/jcp.2010.080259
30. Taneja NK, Dhingra S, Mittal A, Naresh M & **Tyagi JS** (2010) Mycobacterium tuberculosis Transcriptional Adaptation, Growth Arrest and Dormancy Phenotype Development Is Triggered by Vitamin C. PLoS One. 5(5):e10860.
31. Majumdar SD, Sharma D, Vashist A, Kaur K, Taneja NK, Chauhan S, Challu VK, Ramanathan VD, Balasangameshwara V, Kumar P & **Tyagi JS** (2010) Co-expression of DevR and $DevR_N$-Aph proteins is associated with hypoxic adaptation defect and virulence attenuation of *Mycobacterium tuberculosis*. PLoS ONE 5(2): e9448.
32. Chauhan S, Singh A & **Tyagi JS** (2010) A single nucleotide mutation in the -10 promoter region inactivates the *narK2X* promoter in *Mycobacterium bovis* and *Mycobacterium bovis* BCG and has application in diagnosis. FEMS Microbiol. Lett. 303:190-196
33. Gupta RK, Thakur TS, Desiraju GR & **Tyagi JS** (2009) Structure-based design of DevR inhibitor active against non-replicating *Mycobacterium tuberculosis* J. Med. Chem. 52:6324-6334
34. Chauhan S & **Tyagi JS** (2009) Powerful Induction of Divergent *tgs1*-Rv3131 Genes in *Mycobacterium tuberculosis* Is Mediated by DevR Interaction with a High-Affinity Site and an Adjacent Cryptic Low-Affinity Site. J. Bacteriol. 191: 6075-6081.
35. Chauhan S, Kumar A, Singhal A, **Tyagi JS** & Prasad HK (2009) CmtR, a cadmium-sensing ArsR–SmtB repressor, cooperatively interacts with multiple operator sites to autorepress its transcription in *Mycobacterium tuberculosis*. FEBS Journal 276:3428-39.
36. Haldar S, Sharma N, Gupta VK & **Tyagi JS** (2009) Efficient diagnosis of tuberculous meningitis by detection of *Mycobacterium tuberculosis* DNA in cerebrospinal fluid filtrates using PCR. J Med Microbiol. 58: 616-624.
37. Malhotra V, **Tyagi JS** & Clark-Curtiss J.E. (2009) DevR-mediated adaptive response in *Mycobacterium tuberculosis* H37Ra: Links to asparagine metabolismTuberculosis (Edinb). 89:169-74.
38. Chauhan S & **Tyagi JS** (2008) Interaction of DevR with multiple binding sites synergistically activates divergent transcription of *narK2-Rv1738* genes in *Mycobacterium tuberculosis.* J. Bacteriol. 190:5394-5403.
39. Chauhan S & **Tyagi JS** (2008) Cooperative binding of phosphorylated DevR to upstream sites is necessary and sufficient for activation of the *Rv3134c-devRS* operon in *Mycobacterium tuberculosis*: Implication in the induction of DevR target genes. 190:4301-4312.

40. Haldar S, Chakravorty S, Bhalla M, De Majumdar S. & **Tyagi JS** (2007) Simplified detection of *Mycobacterium tuberculosis* in sputum using smear microscopy and PCR with molecular beacons. J Med Microbiol. 56:1356-1362
41. Pathak D, Chakravorty S, Hanif M & **Tyagi JS** (2007) Lysis of tubercle bacilli in fresh and stored sputum specimens: implications for diagnosing tuberculosis in stored and paucibacillary specimens by PCR. BMC Microbiology 2007, 7:83 doi:10.1186/1471-2180-7-83
42. Taneja NK & **Tyagi JS** (2007) Resazurin reduction assays for screening of anti-tubercular compounds against dormant and actively growing *Mycobacterium tuberculosis*, *Mycobacterium bovis* BCG and *Mycobacterium smegmatis*. J Antimicrob Chemotherapy 60:288–293.
43. Sharma D & **Tyagi JS** (2007) The value of comparative genomics in understanding mycobacterial virulence: *Mycobacterium tuberculosis* H37Ra genome sequencing – a worthwhile endeavour. J. Biosci. 32:185-189.
44. Sharma D, Bose A, Shakila H, Das TK, **Tyagi JS** & Ramanathan VD (2006) Expression of mycobacterial cell division protein, FtsZ, and dormancy proteins, DevR and Acr, within lung granulomas throughout guinea pig infection. FEMS Immunol Med Microbiol 48:329-336.
45. **Tyagi JS** (2006) The timeless legacy of Robert Koch. Resonance 11:20-28
46. Chakravorty S, Pathak D, Dudeja M, Haldar S & **Tyagi JS** (2006) PCR amplification of shorter fragments from the *devR* (*Rv3133c*) gene significantly increases the sensitivity of tuberculosis diagnosis. FEMS Micro. Lett. 257: 306-311.
47. Bagchi G, Chauhan S, Sharma D & **Tyagi JS** (2005) Transcription and autoregulation of the *Rv3134c-devR-devS operon* of *Mycobacterium tuberculosis*. Microbiology 151:4045-4053.
48. Sen MK, Chakravorty S & **Tyagi JS** (2005) Polymerase chain reaction to identify *Mycobacterium tuberculosis* in patients with tuberculous lymphadenopathy. Natl. Medical J. India. 18:302-303.
49. Chakravorty S, Sen MK & **Tyagi JS** (2005) Diagnosis of extrapulmonary tuberculosis by smear, culture and PCR using Universal Sample Processing technology. J. Clin. Microbiol. 43:4357-4362.
50. Haldar S, De Majumdar S, Chakravorty S, **Tyagi JS**, Bhalla & Sen MK. (2005) Detection of acid-fast bacilli in postlysis debris of clinical specimens improves the reliability of PCR. J. Clin. Microbiol. 43: 3580-3581.
51. Chakravorty S & **Tyagi JS** (2005) Novel Multipurpose Methodology for Detection of Mycobacteria in Pulmonary and Extrapulmonary Specimens by Smear Microscopy, Culture, and PCR. J. Clin. Microbiol. 43: 2697-2702.
52. Chakravorty S, Dudeja M, Hanif M & **Tyagi JS.** (2005) Utility of Universal Sample Processing Methodology, Combining Smear Microscopy, Culture, and PCR, for Diagnosis of Pulmonary Tuberculosis. J. Clin. Microbiol. 43: 2703-2708
53. Saini DK & **Tyagi JS.** (2005) High-throughput microplate phosphorylation assaysbased on DevR-DevS/Rv2027c 2-component signal transduction pathway to screen for novel antitubercular compounds. J. Biomol. Screening. 10:215-224.
54. **Tyagi JS.** (2004) T.A. Venkitasubramanian. Current Science, 87:1303
55. Prabhakar, S, Mishra A, Singhal A, Katoch VM, Thakral SS, **Tyagi JS** & Prasad HK (2004) Use of the *hupB* gene encoding a histone-like protein of *Mycobacterium*

tuberculosis as a target for detection and differentation of *M. tuberculosis* and *M. bovis*. J. Clin. Microbiol. 42:2724-2732.

56. Saini, DK, Malhotra V & **Tyagi JS.** (2004) Cross talk between DevS sensor kinase homologue, Rv2027c, and DevR response regulator of *Mycobacterium tuberculosis*. FEBS Lett., 565:75-80.
57. Saini DK, Malhotra V, Dey D, Pant N, Das TK & **Tyagi JS.** (2004) DevR-DevS is a bonafide two-component system of *Mycobacterium tuberculosis* that is hypoxia-responsive in the absence of the DNA-binding domain of DevR. Microbiology, 150:865-875.
58. Malhotra V, Sharma D, Ramanathan VD, Shakila H, Saini DK, Chakravorty S, Das TK, Li Q, Silver RF, Narayanan PR & **Tyagi JS.** (2004) Disruption of response regulator gene, *devR*, leads to attenuation in virulence of *Mycobacterium tuberculosis.* FEMS Microbiol. Lett., 231:237-245.
59. Bajpai M, Pratap A, Somitesh C, **Tyagi J**. (FEB 2004) Angiotensin converting enzyme gene polymorphism in Asian Indian children with congenital uropathies. J Urol. 171:838-40.
60. **Tyagi JS** & Sharma D. (2004) Signal transduction systems of mycobacteria with special reference to *M. tuberculosis.* Current Science, 86:93-102.
61. **Tyagi JS** & Saini DK (2004) Did the loss of two-component systems initiate pseudogene accumulation in *M. leprae*? Microbiology, 150: 4-7.
62. **Tyagi JS,** Chakravorty S & Dudeja M (2003) Diagnosis of Tuberculosis: Conventional and new approaches. Trends Clin Biochem Lab Medicine, pp 325-329.
63. Bagchi G, Mayuri & **Tyagi JS** (2003) Hypoxia-responsive expression of *Mycobacterium tuberculosis Rv3134c* and *devR* promoters in *Mycobacterium smegmatis*. Microbiology 149: 2303-5.
64. **Tyagi JS** & Sharma D. (2002) Genomic study of *Mycobacterium tuberculosis* and its clinical applications. Ind. J. Pediatr. 69:S29-S38.
65. Saini, D.K., Pant, N., Das, T.K. & **Tyagi JS** (2002) Cloning, overexpression, purification and matrix – assisted refolding of DevS (Rv 3132c) Histidine Protein Kinase of *Mycobacterium tuberculosis.* Protein Exp. Purification 25:203-208.
66. Mayuri, Bagchi, G. Das, T.K. & **Tyagi JS** (2002) Molecular analysis of the dormancy response in *Mycobacterium smegmatis*: Expression analysis of genes encoding DevR-DevS two-component system, Rv3134c and chaperone α-crystallin homologues. FEMS Microbiol. Lett. 211:231-237.
67. **Tyagi JS** & Sharma, D (2002) *M. smegmatis* and tuberculosis. Trends Microbiol. 10:68-69.
68. Chakravorty, S. & **Tyagi JS** (2001) Novel use of guanidinium isothiocyanate in the isolation of *Mycobacterium tuberculosis* DNA from clinical material. FEMS Microbiol. Lett. 205:113-117.
69. Ray R, Chakravorty S, **Tyagi JS**, Airan B, Talwar KK, Venugopal P & Chopra P (2001) Fatal atypical mycobacterial infection in cardiac transplant recipient. Indian Heart J. 53: 100-103.
70. **Tyagi JS,** Chakraborty S & Dasgupta N (2001) A two-component system, *devR-devS*, of *M. tuberculosis* : its application to diagnosis of tuberculosis. In Biotechnology in Health Care, ed Lazar Mathew T., Sharma, R.K. and Dwarakanath, B.S. (Ed.), pp.145-153, Published by INMAS, Delhi.

71. **Tyagi JS** (2000) Tuberculosis-The real millennium bug. In New Millennium Lectures: Celebration of Science. Indian Science Congress, Pune, Mashelkar, R.A. (Ed.), pp. 293-307, CSIR New Delhi.
72. Dasgupta N, Singh KK, Kapur V, Jyothisri K, Das TK, Sachdeva S & **Tyagi JS** (2000) Identification and characterization of a two-component system, *devR-devS*, of *Mycobacterium tuberculosis*. Tubercle and Lung Disease. 80:141-159.
73. Singh KK, Muralidhar M, Kumar A, Chattopadhyaya TK, Kapila K, Singh MK, Sharma SK, Jain NK, **Tyagi JS** (2000) Comparison of in house polymerase chain reaction with conventional techniques for the detection of *Mycobacterium tuberculosis* DNA in granulomatous lymphadenopathy. J. Clin. Pathol. 53:355-361.
74. Verma A, Sampla AK & **Tyagi JS** (1999) *Mycobacterium tuberculosis rrn* promoters: Differential usage and growth-rate dependent control. J. Bacteriol. 181:4326-4333.
75. Singh KK Nair MD, Radhakrishnan K & **Tyagi JS** (1999) Utility of PCR assay in diagnosis of en-plaque tuberculoma of brain. J. Clin. Microbiol. 37: 467-470.
76. Savita P, Raha K, Annapurna PS, Kaur S, Islam N, Zzaman S, Raje M, Dey AB, Jain NK, Kothekar V, **Tyagi JS** & Prasad HK. (1999)DNA binding protein HLP_{Mt} of *Mycobacterium tuberculosis* : A target of human immune response. Immunopharmacology:Strategies for immunotherapy, S.N. Upaadhyay (ed.), Narosa Publishing House, New Delhi.
77. Dasgupta N & **Tyagi JS** (1998) Identification of a RFLP associated with a deletion in *M. tuberculosis* Erdman that maps in a transcriptionally active open reading frame, *orfX*, in *Mycobacterium tuberculosis* Erdman. Tubercle and Lung Disease. 79: 75-81.
78. Prabhakar S, Annapurna PS, Jain NK, Dey AB, **Tyagi JS** & Prasad HK (1998) Identification of an immunogenic histone-like protein (HLP_{Mt}) of *Mycobacterium tuberculosis*. Tubercle and Lung Disease. 79:43-53.
79. **Tyagi JS**, Das TK & Kinger AK (1996) An *M. tuberculosis* DNA fragment contains genes encoding cell division proteins FtsX and FtsE, a basic protein and homologues of PemK and Small protein B Gene 177:59-67.
80. Verma A, Dasgupta N, Aggrawal AN, Pande JN & **Tyagi JS** (1995) Utility of a *M. tuberculosis* GC-rich repetitive sequence in the diagnosis of tuberculous pleural effusion by PCR. Indian Journal of Biochemistry & Biophysics. 32:429-436.
81. Jaber, M., Rattan, A., Verma, A., Tyagi, J.S. & Kumar, R. A simple method of DNA extraction from *M. tuberculosis*. Tubercle and Lung Disease (1995) 76:578-581.
82. Kaul M, Verma A & **Tyagi JS** (1994) A highly sensitive nonradioactive method for the detection of *M. tuberculosis* DNA Biochemica. 11:28-29.
83. Verma A, Rattan A & **Tyagi JS** (1994) Development of a 23S rRNA-based PCR assay for the detection of mycobacteria Indian Journal of Biochemistry & Biophysics. 31:288-294.
84. Verma A, Kinger AK & **Tyagi JS** (1994) Functional analysis of transcription of the *Mycobacterium tuberculosis* 16S rDNA-encoding gene. Gene. 148:113-118.
85. Kinger AK, Verma A & **Tyagi JS** (1993) A method for the isolation of pure intact RNA from mycobacteria. Biotechniques. 14:724-725.
86. Kinger AK & **Tyagi JS** (1993) Identification and cloning of genes differentially expressed in the virulent strain of *Mycobacterium tuberculosis.* Gene 131:113-117.
87. **Tyagi JS** & Kinger AK (1992) Identification of the 10Sa RNA structural gene of *Mycobacterium tuberculosis.* Nucl. Acids Res. 20:138.

88. **Tyagi JS**, Tyagi AK & Bhargava S (1990) Transfer RNA genes in mycobacteria: organization and molecular cloning. Trop. Med. & Parasitol. 41:294-296.
89. Bhargava S, Tyagi AK & **Tyagi JS** (1990) tRNA Genes in Mycobacteria: Organization and molecular cloning. J. Bacteriol. 172:2930-2934.
90. **Tyagi JS** (1989) DNA polymorphism in clinical medicine Natl. Med. J. India. 2:109-110
91. **Tyagi JS** & Pastan I (1990) Purification of calf thymus RNA polymerase II for in vitro transcription studies J. Biochem. Biophys. Meth. 21:1-8.
92. **Tyagi JS**, Hirano H & Pastan I (1985) Modulation of fibronectin gene activity in chick embryo fibroblasts transformed by a temperature-sensitive strain (ts 68) of Rous sarcoma virus. Nucl. Acids Res. 13: 8275-8284.
93. Merlino GT, **Tyagi JS,** de Crombrugghe B & Pastan I (1984). Activity of a chick α-2 (I) collagen gene in heterologous and homologous cell-free extracts. In Eukaryote Gene Expression, ed. A. Kumar, Plenum Publishing Corporation, p 161-177.
94. **Tyagi JS**, Hirano H, Merlino GT, de Crombrugghe B & Pastan I (1983) Transcriptional control of the fibronectin gene in chick embryo fibroblasts transformed by Rous sarcoma virus J. Biol. Chem. 258: 5787-5793.
95. **Tyagi JS**, Merlino GT, de Crombrugghe B & Pastan I (1982) Chicken embryo extracts contain a factor that preferentially blocks the accumulation of RNA polymerase II transcripts in a cell-free system. J. Biol. Chem. 257: 13001-13008.
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List of Patents:

P1. A process for identifying and producing DevR protein of *Mycobacterium tuberculosis.* Indian patent granted -184437
P2. A rapid efficient single-tube extraction procedure for the isolation of PCR-amplifiable *M. tuberculosis* DNA from clinical specimens. Indian patent granted -191511

P3. A method for preparation and preservation of clinical samples for microbial infections. Granted -228304 (old name 202383), Indian patent

P4. Involvement of a two-component system *devR-devS* (*Rv3133c-Rv3132c*) in the virulence of *M. tuberculosis*: Potential as a new antitubercular drug target. Indian patent granted -19375

P5. A screening method for developing drugs against pathogenic microbes having two-component system. Filed- Indian, US, PCT [published]

P6. A process for identifying a novel target for use for the development of therapeutic modalities and drugs effective against tuberculosis. Granted - UK GB 2398302; Russian 2280693; EP 1472339 (GERMANY 602 25 722.0-08, FRANCE, SWEDEN), US 7332340 B2, Japan 4229238

P7. A method for diagnosis of tuberculosis by smear microscopy, culture and polymerase chain reaction using processed clinical samples and kit thereof. [Indian patent granted, National phase filed in China, Europe, US and ARIPO countries] Granted- EP 1897957, EP 16949014; designated in Germany, France, Great Britain, Italy.

P8. A simple and fast process for evaluating *Mycobacterium tuberculosis* promoters and the effect of candidate antimycobacterial compounds on promoter activity and bacterial viablility under hypoxic and aerobic conditions using *M. smegmatis* as a surrogate host." Indian patent granted - 211217.

P9. Novel Aptamer based Detection System for Tuberculous Meningitis. Indian Provisional Patent application no. 201611001550, filed on 15.01.2016

P10. Isolated single stranded polynucleotides and uses thereof in diagnosis and treatment of Tuberculous Meningitis. Indian Provisional Patent Application no. 201611021901, filed on 27.06.2016.

P11. Aptamer based diagnostic and therapeutic agent for and against HupB of Mycobacterium tuberculosis. Indian Provisional Patent Application no. 201711001246 , filed on 12.01.2017.