

Adhar C. Manna, Ph.D.

Academic Position: Professor

Address

- School of Life Sciences,
Presidency University,
86/1 College Street,
Kolkata, WB 700073,
India.

E-mail: adh03@hotmail.com; adhar.physio@presiuniv.ac.in

Tel. No. +91-9674226447; 033-2241-1960.

Education

- **Ph. D., Molecular Biology**, Jawaharlal Nehru University, India, 1994.
Dissertation: Molecular characterization of the leucine operon and chromosomal analysis of Azotobacter vinelandii.
- **M. Phil., Molecular Biology**, Jawaharlal Nehru University, India, 1991.
Dissertation: preliminary study of some nif and leu genes of Azotobacter vinelandii
- **M. Sc., Biotechnology**, Jawaharlal Nehru University, India, 1987.
Dissertation: Production of ethanol from immobilized amylase.
- **B. Sc., Physics (Honors)**, University of Calcutta, India, 1984.

Academic Appointments

- **Professor**, Department of Physiology, Presidency University, Kolkata, July 2012 - Present.
- **Assistant Professor**, Basic Biomedical Sciences, Sanford School of Medicine, University of South Dakota, 2005 -2012 .
- **Research Assistant Professor**, Microbiology & Immunology Department, Dartmouth Medical School, 2001-2005.
- **Scientist E.I**, Central Drug Research Institute, India, 1999-2001.
- **Postdoctoral Fellow/Associate**, Division of Bacterial Pathogenesis, The Rockefeller University, 1996-1999.
- **Research Associate**, Microbiology & Immunology Department, Duke University Medical Center, 1994-1996.
- **Junior/Senior Research Fellow**, School of Environmental Sciences, Jawaharlal Nehru University, India, 1988-1993.

- **Research Scientist B**, Genetic Engineering, Jawaharlal Nehru University, India, 1987-1988.

Honors, Awards, & Professional Memberships

- Member, Indian Society of Cell Biology, 2012- present.
- Member, Indian Science Congress Association, 2012- present.
- Member, American Society for Microbiology, 2001 – present.
- Member, American Association of Advancement of Science, 2001 - 2012.
- Member, Sigma Xi, The Scientific Research Society, 2007 - 2011.
- Dean's Team Award, South Dakota State University, 2005.
- Junior/Senior Research Fellowship for post graduate studies, Govt. of India, 1988-93.
- GATE Engineering Scholarship for post graduate studies, Govt. of India, 1988.
- Scholarship, Master Degree Program in Biotechnology, Govt. of India. 1985-1987.
- National Scholarships, Govt. of India, 1985.

Patent

- United States Patent # 7,339,043 B2, Mar., 2008. Ambrose L Cheung and Adhar C Manna. Compositions and methods for affecting virulence determinants in bacteria.

Publications (* corresponding author)

From Presidency University

1. Manna, A. C. 2012-2013. Genetic interruption of target genes for investigation of virulence factors. *Methods in Molecular Biology: MRSA protocol*. Y. Ji (ed). Humana Press Inc., Totowa, NJ. (**Chapter**).
2. Lucas, A. L., and A. C. Manna*. 2012. Phenotypic characterization of *sarR* mutant in *S. aureus*. *Microbial Path.* 2012 Nov 23. pii: S0882-4010(12)00200-8. doi: 10.1016/j.micpath.2012.11.008.

From The University of South Dakota

3. Manna, A. C. 2012. Synthesis, characterization and antimicrobial activity of zinc oxide nanoparticles. Chapter 5 on book title "*Nano-Antimicrobials*" N. Cioffi and M. Rai (eds). Springer-Verlag Berlin Heidelberg (**Chapter**).
4. Krishna R Raghupati, Ranjit T. Koodali*, and A. C. Manna*. 2011. Size dependent bacterial growth inhibition of zinc oxide nanoparticles *Langmuir* 27: 4020-4028.
5. Ballal, A. and A. C. Manna*. 2010. Control of thioredoxin reductase (*trxB*) transcription by SarA in *Staphylococcus aureus*. *J. Bacteriol* 192: 336-345.
6. Ray, B. and A. Ballal and A. C. Manna*. 2009. Transcriptional variation of regulatory and virulence genes due to different media in *S. aureus*. *Microbial Path.* 47: 94-100.
7. Ballal, A. and A. C. Manna*. 2009. Expression of the *sarA* family genes in different *S. aureus*. *Microbiology* 155: 2342-2352.

8. Ballal, A. and A. C. Manna*. 2009. Regulation of superoxide dismutase (*sod*) genes by SarA in *Staphylococcus aureus*. **J. Bacteriol.** 191: 3301-3310.
9. Ballal, A., B. Ray, and A. C. Manna*. 2009. *SarZ*, a *sarA* family gene, is transcriptionally activated by MgrA and involved in the regulation of exoproteins synthesis in *Staphylococcus aureus*. **J. Bacteriol** 191: 1656-65.
10. Cheung, A. L., Nishina, K., and A. C. Manna. 2008. SarA of *S. aureus* binds to its own promoter to regulate gene expression. **J. Bacteriol.** 190: 2239-2243.
11. Jones, N., B. Ray, R. T. Koodali, and A. C. Manna*. 2008. Antibacterial activity of ZnO nanoparticle suspensions on broad spectrum of microorganisms. **FEMS Microbiology Letters.** 279:71-76.
12. Manna*, A. C. and B. Ray. 2007. Regulation and characterization of *rot* transcription in *Staphylococcus aureus*. **Microbiology:** 135:1538-1545.
13. Manna*, A.C. and A. L. Cheung. 2006. Expression of SarX, a Negative Regulator of *agr* and Exoproteins Synthesis, Is activated by MgrA in *Staphylococcus aureus*. **J. Bacteriol.** 188:4288-4299.
14. Manna*, A. C., and A. L. Cheung. 2006. Transcriptional regulation of the *agr* locus and the identification of DNA-binding residues of the global regulatory protein SarR in *Staphylococcus aureus*. **Mol. Microbial.** 60:1289-1301.

From Dartmouth Medical School

15. Manna[§], A.C., Liu[§], Y., C-H., Pan[§], Kriksunov, I. A., Thiel, D. J., A. L. Cheung, and G. Zhang. 2006. Structural and Functional analyses of the global regulatory protein SarA from *Staphylococcus aureus*. **Proc. Natl. Acad. Sci. USA.** 103 :2392-2397 ([§] equal authors).
16. Trotonda, M. P., A. C. Manna, A. L. Cheung, I. Lasa and J. R. Penades. 2005. SarA control Bap-dependent biofilm formation in *Staphylococcus aureus*. **J. Bacteriol.** 187: 5790-5798.
17. Cheung, A. L. and A. C. Manna*. 2005. The role of the distal *sarA* promoters in SarA expression. **Infect. & Immun.** 73: 4391-4394.
18. Tormo, M. A., M. Marti, J. Valle, A. C. Manna, A. L. Cheung, I. Lasa, and J. R. Penades. 2005. SarA is an essential positive regulator of *Staphylococcus epidermidis* biofilm development. **J. Bacteriol.** 187: 2348-2356.
19. Manna*, A. C., S. S. Ingavale, M. Maloney, W. van Wamel, and A. L. Cheung. 2004. Identification of *sarV* (SA2062), a new transcriptional regulator, is repressed by SarA and MgrA (SA0641) and involved in the regulation of autolysis in *Staphylococcus aureus*. **J. Bacteriol.** 185 : 5267-5280.
20. Xiong, Y-Q., A. S. Bayer, M. R. Yeaman, W. van Wamel, A. C. Manna., and A. L. Cheung. 2004. Impacts of *sarA* and *agr* in *Staphylococcus aureus* strain Newman on fibronectin-binding protein A gene expression and fibronectin adherence capacity in vitro and in experimental infective endocarditis. **Infect. & Immun.** 72: 1832-1836.
21. Schmidt, K. A., A. C. Manna, and A. L. Cheung. 2003. *sarT* influences the expression of *sarS* in *S. aureus*. **Infect. & Immun.** 71: 5139-5148.

22. R. Li, A. C. Manna, Dai, S., A. L. Cheung, and G. Zhang. 2003. The crystal structure of the SarS protein from *Staphylococcus aureus*. *J. Bacteriol.* 185: 4219-4225.
23. Manna*, A. C., and A. L. Cheung. 2003. SarU, a SarA homolog, is repressed by *sarT* and regulates the virulence genes in *Staphylococcus aureus*. *Infect. & Immun.* 71: 343-353.
24. Schmidt, K.A., A. C. Manna, S. Gill, and A.L. Cheung. 2001. SarT, a repressor of α -hemolysin in *Staphylococcus aureus*. *Infect. & Immun.* 69: 4749-4758.
25. Y. Liu, A. Manna, R. Li, W.E. Martin, R. C. Murphy, A. L. Cheung and G. Zhang. 2001. Crystal structure of the SarR protein from *Staphylococcus aureus*. *Proc. Natl. Acad. Sci. USA.* 98 : 6877 – 6882.
26. A. L. Cheung, K. Schmidt, B. Bateman, and A. C. Manna. 2001. SarS, a SarA homolog repressible by *agr*, is an activator of protein A synthesis in *Staphylococcus aureus*. *Infect. & Immun.* 69 : 2448-55.
27. Manna, A. and A. L. Cheung. 2001. Characterization of *sarR*, a modulator of *sar* expression in *Staphylococcus aureus*. *Infect. & Immun.* 69 : 885-896.

From The Rockefeller University

28. Wolz, C., P. Pohlmann- Dietze, A. Steinhuber, Y-t.Chien, A. Manna, W. van Wamel, and A. L. Cheung. 2000. *Agr* independent regulation of fibronectin-binding protein(s) by the regulatory locus *sar* in *Staphylococcus aureus*. *Mol. Microbial.* 36 : 230 - 243.
29. Chien, Y-t., A. C. Manna, S. Projan, and A. L. Cheung. 1999. SarA, a global regulator of virulence determinants in *Staphylococcus aureus*, binds to a conserved motif essential for *sar*-dependent gene regulation. *J. Biol. Chem.* 274 : 37169 - 37176.
30. Chien, Y-t, A. C. Manna, and A. L. Cheung. 1998. SarA level is an important factor for *agr* activation in *Staphylococcus aureus*. *Mol. Microbial.* 30: 991 - 1002.
31. Manna, A. C., M. G. Bayer, and A. L. Cheung. 1998. Transcriptional analysis of different promoters in the *sar* locus in *Staphylococcus aureus*. *J. Bacteriol.* 180: 3828 - 3836.

From the Duke University Medical Center

32. Bastia, D., A. C. Manna, and T. Sahoo. 1997. Termination of DNA replication in prokaryotic chromosome. *Genetic Engineering* 19: 101-119 (Review).
33. Manna, A. C., K.S. Pai, D. E. Bussiere, C. Davis, S. W. White and D. Bastia. 1996. Helicase-contrahelicase interaction and the mechanism of termination of DNA replication. *Cell* 87: 881-891.
34. Manna, A. C., K. S. Pai; D.E. Bussiere; S. W. White and D. Bastia. 1996. The dimmer-dimer interaction surface of the replication terminator protein of *Bacillus subtilis* and termination of DNA replication. *Proc. Natl. Acad. Sci. USA.* 93 : 3253 – 3258.
35. Sahoo, T., B. K. Mohanty, M. Lobert, A. C. Manna, and D. Bastia. 1995. The contrahelicase activities of the replication terminator proteins of *Escherichia coli* and *Bacillus subtilis* are helicase-

specific and impede both helicase translocation and authentic DNA unwinding. *J. Biol. Chem.* 270 : 29138-44.

From the Jawaharlal Nehru University, India

36. Manna, A. C. and H. K. Das. 1997. The *Azotobacter vinelandii* chromosome. *J. Genet.* 76 : 55 - 60.
37. Manna, A. C. and H. K. Das. 1997. Characterization and mutagenesis of the leucine biosynthetic genes of *Azotobacter vinelandii*: an analysis of the rarity of amino acid auxotrophs. *Mol. Gen. Genet.* 254: 207 - 217.
38. Manna, A. C., and H. K. Das. 1994. The size of the chromosome of *Azotobacter chroococcum*. *Microbiol.* 140: 1237 -1239.
39. Manna, A. C. and H.K. Das. 1993. Determination of the size of *Azotobacter vinelandii* chromosome. *Mol. Gen. Genet.* 241: 719 -722.

Conferences Attended & Presentations (Last 5 Yrs)

Conferences attended

- 100th Indian Science Congress, Kolkata, India, Jan 3-7, 2013.
- Global Frontiers in Vaccine Development, Sioux Falls, SD, Oct.6-7, 2011.
- 12th NARSA Annual Investigators Meeting, Reston, VA, March 2011.
- Sigma Xi Annual Meeting & Student Research Conference, NC, November 2010.
- 11th NARSA Annual Investigators Meeting, Reston, VA, March 2010.

Poster Presentations

- Adhar C Manna, and B. Ray. “New Insights of the Sar-family regulators in *S. aureus*.” *International Conference on Gram-Positive Pathogens*, Omaha, NE, 2010.
- Andrea L Lucas and Adhar C Manna. “Intracellular survival of *S. aureus* in murine macrophages.” *International Conference on Gram-Positive Pathogens*, Omaha, NE, 2010.
- Adhar C Manna, B. Ray and A Lucas. “Dissecting the function of the conserved residue, aspartic acid (D), of the Sar-family of transcription regulators in *S. aureus*.” *ASM 110th General Meeting*, San Diego, CA, 2010.
- Binata Ray, A. Lucas, and Adhar C Manna. “Phenotypic Microarray analysis of *Staphylococcus aureus* *sarA* mutant.” *ASM 110th General Meeting*, San Diego, CA, 2010.
- Ballal, A. and Adhar C Manna. 2010. “Involvement of the *sar*-family of genes in oxidative stress-responses in *S. aureus*.” *International Conference on ‘Infectious Diseases: Novel Strategies for the Design & Development of Vaccines & Drugs’ (CID2010)*, Mumbai, India, 2010.
- Anand Ballal and Adhar C Manna. “SarA modulates the oxidative stress response in *S. aureus*.” *International Conference on Gram-Positive Pathogens*, Omaha, NE, 2008.

- Binata Ray and Adhar C Manna. “Phenotypic characterization of the *sarA* family genes in *S. aureus*.” *International Conference on Gram-Positive Pathogens*, Omaha, NE, 2008.
- Krishna R. Raghupathi, Adhar C Manna, and Ranjit T. Koodali. “Developing anti-microbial agents based on metal oxides nanoparticles.” *International Conference on Gram-Positive Pathogens*, Omaha, NE, 2008.

Oral/Seminar Presentations

- Adhar C Manna, “Regulation of Oxidative Stress-Responsive Genes by Sar-family regulators in *S. aureus*” at XXXVI All India Cell Biology Conference & International Symposium on “Stress Adaptive Response and Genome Integrity” at BARC, Mumbai, India, Oct 17-19,2012.
- Adhar C Manna “Regulation of virulence factors by staphylococcal specific SarA protein family”. *International Conference on Gram-Positive Pathogens*, Omaha, NE, 2008.
- Adhar C Manna. “ZnO-nanoparticles, as an antibacterial agent.” *International conference on frontier researches in integrative physiology (ICFRIP)* Calcutta, India, 2007.
- Adhar C Manna. “SarA family of transcriptional regulators in *Staphylococcus aureus*: regulation, and complexity.” Department of Molecular and Cellular Genetics, Presidency College, University of Calcutta, Calcutta, India, 2007.
- Adhar C Manna. “The SarA Family of Transcriptional Regulators: A Potential Anti-staphylococcal target?” Center for Biotechnology, University of Calcutta, Calcutta, India, 2006.
- Adhar C Manna. “Role of the SarA protein family in regulation of various genes in *Staphylococcus aureus*”. *International Conference on Gram-Positive Pathogens*, Omaha, NE, 2006.

Intra/Inter-Institutional Presentations

- Adhar C Manna. “Developing anti-microbial agents based on: the SarA protein family in *Staphylococcus aureus* and metal oxide nanoparticles.” Invited talk, *SD-BRIN Faculty Meeting*, Chamberlin, SD, 2010.
- Anand Ballal, and Adhar C Manna. “SarA modulates the oxidative stress response in *Staphylococcus aureus*.” Poster, *Centennial Research Symposium, USD, SD*, 2008.
- Adhar C Manna, Anand Ballal, and Binata Ray. “Staphylococcal specific SarA protein family : a potential anti-staphylococcal target.” Poster, *Centennial Research Symposium, USD, SD*, 2008.
- Krishna R. Raghupathi, Adhar C Manna, and Ranjit T. Koodali. “Developing anti-microbial agents based on metal oxides nanoparticles.” Poster, *Centennial Research Symposium, USD, SD*, 2008.
- Adhar C Manna, Attended, *IDeA States Central Regional Meeting for INBRE and COBRE*, ND, 2007.

- Adhar C Manna. Presentation, *Center for Infectious Disease Research and Vaccinology, SD*, annual meeting, 2005, 2006, 2007, 2008, 2009. 2010.

Grants Received

- **Extramural Grants**

1. “Determine the relative virulence and the temporal expression of the *sarA* paralogs genes in *S. aureus*”. The University of South Dakota, funded by National Institutes of Health, 07/2009-06/2011, approx. \$358,750. Role: PI. Type: R21.

- **Intramural Grants**

1. “Investigate the survival and replication of various *sar*-family mutants in murine macrophages”. Sanford Research grant, University of South Dakota, 06/2009-5/2010, \$5,000. Role PI.
2. “Determination of the numbers of target genes and the consensus MgrA binding site in *S. aureus* genome.” USD-INBRE Pilot Research Grant Program, 06/2007- 5/2009, \$50,000.
3. “Regulation and virulence mechanism in *Staphylococcus*.” Mid-West Gram-Positive Consortium. May 2006. Funded: \$15,000.

Dissertation Supervised/Supervising

1. Krishna R. Raghupathi, “Synthesis, characterization and antibacterial activity of nanocrystalline zinc oxide”. Master of Science, Department of Chemistry, The University of South Dakota, 2009. Co-Chairperson (Chairperson Dr. R. T. Koodali).
2. Andrea L Lucas, “Phenotypic characterization of *sarR* mutant in *S. aureus*.” Master of Science, Division of Basic Biomedical Sciences, The University of South Dakota, July 2011.

- Undergraduate & Graduate students mentored: 9
- SD-BRIN Summer students Mentored: 6
- Master & Ph. D. dissertation/thesis committee served/serving : 8

Administrative Services:

- Member, Graduate Admission Committee, 2008-2011.
- Member, Faculty Development Committee, 2008- 2011.
- Member, University Intellectual Property Committee, 2008 - 2011.
- Served, Graduate Recruitment Taskforce, 2008.
- Served, Immunology Search Committee, 2007-08; Infectious Diseases Search Committee, 2009-10.
- Coordinator, Microbiology & Immunology Lab./Journal club, 2007-2010.
- Secretary, USD Chapter Sigma Xi, 2007- 2011.

Teaching:

- Taught Part of Medical Microbiology 620 Course, 2007 - .
- Taught Part of Graduate Foundation I Course, 2009 - .

- Taught Part of Undergraduate Microbiology 320 Course, 2008 - .

Teaching interests:

Molecular Biology
Microbiology
Medical Microbiology
Molecular basis or genetics of infectious diseases

Professional Service/Other Scholarly Activities

- **Editorial Board:** Journal of Microbiology Research; The Scientific World Journal
- Adhoc Reviewer: NIH.
- **Reviewer:** *Journal of Bacteriology*, 2007- present; *Archives Biochemistry and Biophysics*, 2008- present ; *Infection and Immunity*, 2003 - present; *Tubercule*, 2008 - present; *Plasmid*, 2009 - present; *BMC Microbiology*, 2009 - present; *Environ. Science & Technology*, 2010 - present; *Applied & Environ. Microbiology*; 2009 - present; *Scand. Journal of Infectious Disease*, 2009 - present; *Microbiology*, 2009 - present; *FEMS Microbiology Letters*, 2010 - present; *PLOS One*, 2009 - present; *Langmuir*, 2009 - present; *Acta Biomaterilia*, 2011- present; *African J Microbiology Research*, 2010 - present; *Environ. Pollution*, 2010 - present; *Annals Microbiology*, 2011-present; *Medical Sci Monitor*, 2011 -present; *ACS Applies Materials & Interfaces*, 2011 -present; *Materials Research Bulletin* 2010 - present; *World J of Microbiology and Biotechnology* 2011 - present; *The Scientific World Journal* 2011-present.