



## **THANDAVARAYAN RAMAMURTHY**

### **EDUCATION:**

B. Sc. 1977, Presidency College, Madras University

M. Sc. 1979, Center of Advanced Study in Marine Biology, Annamalai University

Ph. D. 1985, Center of Advanced Study in Marine Biology, Annamalai University

### **CARRIER MILLSTONES:**

Assistant Director, National Institute of Cholera and Enteric Diseases, Calcutta, 1997-2002.

Deputy Director, National Institute of Cholera and Enteric Diseases, Calcutta, 2002-2007

Scientist-F, National Institute of Cholera and Enteric Diseases, Calcutta, 2007-2012

Scientist-G, National Institute of Cholera and Enteric Diseases, Calcutta, 2012-2015

National Chair, Translational Health Science and Technology Institute, Faridabad (2015~)

### **AWARDS/AFFILIATIONS**

1. Fellow of the Indian National Science Academy , New Delhi
2. Fellow of the National Academy of Sciences, Allahabad
3. Guest Researcher award, Japan Health Science Foundation. Research to work in the Department of Infectious Diseases, National Children's Medical Research Center, Setagaya-ku, Tokyo, Japan, 1993-1996.
4. Research Scientist award to work in the International Medical Center of Japan, Shijuku, Tokyo, Japan, from 1996-1997.
5. Association of Microbiologist of India
6. Indian Association for Environmental Management
7. International Association on Water Pollution Research and Control
8. Japanese Society for Bacteriology
9. Society of Biological Chemists India
10. Member in the Food Microbiology Sectional committee, Bureau of India Standards (BIS)
11. Associate Member in the International Scientific Form on Home Hygien
12. DBT Nominee of the Institutional Biosafety committee- Bose Institute, Kolkata (2012~)
13. Member of the Institutional Biosafety committee- Indian Institute of Chemical Biology (IICB) Kolkata (2013-2015)
14. Member of the Task force committee of Infectious Diseases, Department of Biotechnology, Govt. India. (2012-2014)
15. Member of the Programme Advisory Committee in Health Sciences under Science and Engineering Board, Department of Science and Technology, Govt. India (2012-2015)

16. Member in the WHO Foodborne Disease Burden Epidemiology Expert Group (2013-2018)
17. Member of the Institutional Ethics Committee, Bengal Engineering and Science University, Shibpur, West Bengal (2013-2016)
18. Member in the Sectional Committee IX, Indian National Science Academy, New Delhi (2014)
19. Member in the WHO Advisory Group on Integrated Surveillance of Antimicrobial Resistance (AGISAR) (2014-2019)

## EDITORIAL BOARD

1. Associate Editor: Frontiers in Environmental Health
2. Board member: Journal of Medical Microbiology Case Reports (2014-)
3. Board member: World Journal of Microbiology and Biotechnology (2005-2013)
4. Board member: World Journal of Vaccines
5. Board member: Molecular and Cellular Probes

## RESEARCH INVOLVEMENTS

1. Clinical Microbiology: Isolation, identification, antimicrobial susceptibility testing and virulence characterization of human enteric bacteria and anaerobes.
2. Environmental and Food Microbiology: Isolation and identification of marine methanogenic bacteria. Water pollution studies, ecology of enteric bacteria and quality control of seafood. Rapid detection of food-borne pathogens with special reference to enteric bacteria.
3. Immunological techniques: Production of polyclonal and monoclonal antibodies. Rapid detection of enteric toxins.
4. Biological assay: Detection of bacterial toxins by tissue culture assay.
5. Molecular biology: Cloning and sequencing analysis, epidemiological analysis using pulsed field-gel electrophoresis and ribotyping.
6. Analysis of multiple antibiotic resistance mechanisms using molecular techniques.

## PROJECTS OPERATED

1. Principal Investigator of the Council of Scientific and Industrial Research funded *Escherichia coli* project entitled "Detection distribution and molecular characterization of virulent genes form diarrhoeagenic *Escherichia coli*" (2000-2003).
2. Principal Investigator of the Indian Council of Medical Research funded research project entitled "Monitoring of multiply antibiotic resistance among clinical strains of enteric pathogens" (2001-2004).
3. Principal investigator of the Department of Biotechnology sponsored project entitled "Phase II and phase III human trials with candidate oral cholera vaccine VA 1.3 – a multicentric study" (1999-2006)
4. Principal Investigator of the Department of Science and Technology sponsored project entitled "Validation of PCR based assays/kits at different centers for the detection of food-borne pathogens" (2003-2004).
5. Principal Investigator in the Ministry of Health, Welfare and Labor, Govt. of Japan sponsored research project on "Phenotypic and genotypic characterization of common enteric pathogens isolated from diarrheal patients: a National study" (2005-2009).
6. Principal Investigator (Microbiology) of the Bill Gate Melinda Foundation project entitled "Mortality and morbidity burden and etiology of diarrheal disease in infants and young children in developing countries: Global database to prepare for vaccine introduction" (2006-2012).
7. Coordinator in the Department of Biotechnology, New Delhi sponsored project entitled

- “Comparative analysis of *luxO*, the quorum sensing master regulator among O1, O139 and non-O1, O139 *Vibrio cholerae* strains (2007-2010).
8. Principal investigator (Microbiology) of the Department of Biotechnology sponsored project entitled “A randomized controlled trial of recombinant live oral cholera vaccine in eastern Kolkata using cGMP material” (2007-2011).
  9. Principal Investigator in the Ministry of Health, Welfare and Labor, Govt. of Japan sponsored research project on “Genotyping of *Vibrio cholerae* O1, *Vibrio parahaemolyticus* and *Campylobacter* spp” (2008-2011).
  10. Principal investigator (Laboratory part) of the Department of Biotechnology sponsored project entitled “Trial of candidate live oral cholera vaccine VA1.4: A phase I-II study and immunogenicity in healthy adults in Kolkata, India” (2011-2012).
  11. Principal Investigator of the Bill Gate Melinda Foundation project entitled “Metagenomics based discovery of new viral and eukaryotic pathogens causing diarrheal disease” (2011-2014).
  12. Principal Investigator in the DBT twining Project on “An epidemiological study of *Clostridium difficile*: an emerging pathogen on public health importance” (2012-2015).
  13. Principal Investigator in the DBT twining Project on “Molecular typing and virulence characteristics of *Salmonella* with special reference to non-host specific serovars” (2012-2015).

#### NUMBER OF Ph. D STUDENTS:

1. Completed: 10
2. Currently registered: 3

#### SELECTED PUBLICATIONS:

1. Ramamurthy, T., A. Pal, G. B. Nair, S.C. Pal, T. Takeda, and Y. Takeda (1990). Experience with toxin Bead-ELISA in cholera outbreak. *Lancet* 336: 375-376.
2. Ramamurthy, T., A. Pal, S.C. Pal and G.B. Nair (1992). Taxonomical implications of emergence of high frequency of occurrence of 2, 4,-diamino-6, 7-diisopropylpteridine-resistant strains of *Vibrio cholerae* from clinical cases of cholera in Calcutta, India. *J. Clin. Microbiol.* 30: 742-743.
3. Ramamurthy, T., A. Pal, M.K. Bhattacharya, S.K. Bhattacharya, A.S. Chowdhury, Y. Takeda, T. Takeda, S.C. Pal and G.B. Nair (1992). Serovar, biotype, phagetype, toxigenicity and antibiotic susceptibility patterns of *Vibrio cholerae* isolated during two consecutive cholera seasons (1989-90) in Calcutta. *Ind. J. Med. Res. [A]* 95: 125-129.
4. Ramamurthy, T., S.K. Bhattacharya, Y. Uesaka, K. Horigome, M. Paul, D. Sen, S.C. Pal, T. Takeda, Y. Takeda and G.B. Nair (1992). Evaluation of the bead enzyme linked immunosorbent assay for detection of cholera toxin directly from stool specimens. *J. Clin. Microbiol.* 30: 1783-1786.
5. Ramamurthy, T., S. Garg, R. Sharma, S.K. Bhattacharya, G.B. Nair, T. Shimada, T. Takeda, T. Karasawa, H. Kurazono, A. Pal and Y. Takeda (1993). Emergence of novel strain of *Vibrio cholerae* with epidemic potential in Southern and Eastern India. *Lancet* 341:703-704.
6. Ramamurthy, T., A. Pal, P.K. Bag, S.K. Bhattacharya, G.B. Nair, H. Kurazano, S. Yamasaki, T.

- Takeda and Y. Takeda (1993). Detection of cholera toxin (CT) gene by the polymerase chain reaction in stool specimens: Comparison with the CT bead enzyme linked immunosorbent assay and with culture methods for laboratory diagnosis of cholera. *J. Clin. Microbiol.* 31: 3068-3070.
7. Ramamurthy, T., P.K. Bag, A. Pal, S.K. Bhattacharya, M.K. Bhattacharya, D. Sen, T. Shimada, T. Takeda, Y. Takeda and G.B. Nair (1993). Virulence patterns of *Vibrio cholerae* non-O1 strains isolated from hospitalized patients with acute diarrhoea in Calcutta, India. *J. Med. Microbiol.* 39:310-317.
  8. Ramamurthy, T., M.J. Albert, R.R. Colwell, Y. Takeda, T. Takeda, T. Shimada, B.K. Mandal and G.B. Nair (1994). *Vibrio mimicus* with multiple toxin types isolated from human and environmental sources. *J. Med. Microbiol.* 40: 194-196.
  9. Ramamurthy, T., S. Garg and G.B. Nair (1995). Monoclonal antibodies against Ogawa specific and Ogawa-Inaba common antigenic determinants of *Vibrio cholerae* O1 and their diagnostic utility. *Ind. J. Med. Res.* 101: 10-12.
  10. Ramamurthy, T., S.K. Bhattacharya, G.B. Nair and Y. Takeda (1996). Comparison of the sensitivity and specificity of a polyclonal versus monoclonal capture antibody based Bead ELISA for direct detection of cholera toxin from stool specimens. *Ind. J. Med. Res.* 104: 125-128.
  11. Ramamurthy, T., K. Yoshino, X. Huang, G.B. Nair, E. Carnivel, T. Maruyama, H. Fukushima and T. Takeda (1997). The novel heat-stable enterotoxin subtype gene (*ystB*) of *Yersinia enterocolitica* : nucleotide sequence and distribution of *yst* genes. *Microb. Pathog.* 23: 189-200.
  12. Ramamurthy, T., K. Yoshino, J. Abe, N. Ikeda and T. Takeda (1997). Purification of a variant *Yersinia pseudotuberculosis*-derived mitogen (YPMB), cloning and nucleotide sequence of the *ypmB* gene. *FEBS Letters.* 413: 174-176.
  13. Ramamurthy, T., K. Rajendran., P. Garg., A. Basu, R. Mitra, S. Chakraborty, S. Yamasaki, T. Shimada, S. K. Bhattacharya, Y. Takeda, and G. B. Nair. 2000. Cluster-analysis of multidrug resistance among clinical strains of *Vibrio cholerae* in Calcutta, India. *Indian J. Med. Res.* 112: 78-85.
  14. Garg. P., S. Sinha , R. Chakraborty, S. K. Bhattacharya, G. B. Nair, T. Ramamurthy, and Y. Takeda, 2001. Emergence of fluoroquinolone-resistance strains of *Vibrio cholerae* O1 Biotype El Tor among hospitalized patients with cholera in Calcutta, India. *Antimicrobiol Agents Chemother.* 45: 1605-1606.
  15. Chakraborty, S., J. S. Deokule, P. Garg, S. K. Bhattacharya, R. K. Nandy, G. B. Nair, S. Yamasaki, Y. Takeda, and T. Ramamurthy. 2001. Concomitant infection of enterotoxigenic *Escherichia coli* in an outbreak of cholera caused by *Vibrio cholerae* O1 and O139 in Ahmedabad, India. *J. Clin. Microbiol.* 39: 3241-3246.
  16. Ramamurthy T., S. Chakraborty and G. B. Nair. 2002. Concomitant infection of enterotoxigenic *Escherichia coli* and *Vibrio cholerae*. (Case No. 240). *Casos De Microbiologia Clinica.* June 2002.
  17. Ramamurthy, T., S. Yamasaki, Y. Takeda and G. Balakrish Nair. 2003. *Vibrio cholerae* O139 Bengal: Odyssey of a fortuitous variant. *Microbes. Infect.* 5: 329-344.
  18. Chakraborty S., A. Khan, S. Kahali, S. M. Faruque, S. Yamasaki, and T. Ramamurthy. 2003.

- Infantile diarrhea associated with sorbitol-fermenting, non-shiga toxin-producing *Escherichia coli* O157:H<sup>-</sup>. Eur. J. Clin. Microbiol. Infect. Dis. 22:324-326.
19. Sarkar, B., N. R. Chowdhury, G. B. Nair, M. Nishibuchi, S. Yamasaki, Y. Takeda, S. K. Gupta, S. K. Bhattacharya and T. Ramamurthy. 2003. Molecular characterization of *Vibrio parahaemolyticus* of similar serovars isolated from sewage and clinical cases of diarrhoea in Calcutta, India. World J. Microbiol. Biotechnol. 19: 771-776.
  20. Pandey, M., A. Khan, S. C. Das, B. Sarkar, S. Kahali, S. Chakraborty, S. Chatterjee, S. Yamasaki, Y. Takeda, G. B. Nair and T. Ramamurthy. 2003. Association of cytolethal distending toxin locus *cdtB* with enteropathogenic *Escherichia coli* isolated from acute diarrheal patients in Calcutta, India. J. Clin. Microbiol. 41:5277-5281.
  21. Kahali, S. B. Sarkar, S. Chakraborty, R. Macaden, J. S. Deokulle, M. Ballal, R. K. Nandy, S. K. Bhattacharya, Y. Takeda and T. Ramamurthy. 2004. Molecular epidemiology of diarrhoeagenic *Escherichia coli* associated with sporadic and outbreaks of diarrhoea between 2000 and 2001 in India. Eur. J. Epidemiol. 19:473-479.
  22. Kahali, S., B. Sarkar, K. Rajendran, J. Khanam, S. Yamasaki, R. K. Nandy, S. K. Bhattacharya, and T. Ramamurthy. 2004. Virulence characteristic and molecular epidemiology of enteroaggregative *Escherichia coli* (EAEC) from hospitalized diarrheal patients in Kolkata, India. J. Clin. Microbiol. 42:4111-4120.
  23. Sinha, S., S. Chattopadhyay, S. K. Bhattacharya, G. B. Nair and T. Ramamurthy. 2004. Unusually high-level quinolone resistance associated with type II topoisomerase mutations in quinolone resistance-determining regions of *Aeromonas caviae* isolated from diarrheal patients. Res. Microbiol. 155:827-829.
  24. Chakraborty, R., S. Sinha, A. K. Mukhopadhyay, M. Asakura, S. Yamasaki, S. K. Bhattacharya, G. B. Nair, and T. Ramamurthy. 2006. Species-specific identification of *Vibrio fluvialis* by PCR targeted to the conserved transcriptional activation and variable membrane tether regions of *toxR* gene. J. Med. Microbiol. 55: 805-808.
  25. Sen, B., B. Dutta, S. Chatterjee, M. K. Bhattacharya, R. K. Nandy, A. K. Mukhopadhyay, B. D. N. Gangopadhyay, S. K. Bhattacharya, and T. Ramamurthy. 2006. The first outbreak of acute diarrhea due to pandemic strain of *Vibrio parahaemolyticus* O3:K6 in Kolkata, India. Internal. J. Infect. Dis. 11: 185-187.
  26. Dutta, B., R. Ghosh, N. C. Sharma, G. P. Pazhani, N. Taneja, Raychowdhuri, B. L. Sarkar, S. K. Mondal, A. K. Mukhopadhyay, R. K. Nandy, M. K. Bhattacharya, S. K. Bhattacharya, and T. Ramamurthy. 2006. Spread of Cholera with new clone of *Vibrio cholerae* O1 El Tor, serotype Inaba in India. J. Clin. Microbiol. 44:3391-3393.
  27. Asakura, M., A. Hinenoya, M. S. Alam, K. Shima, S. H. Zahid, L. Shi, A. N. Ghose, N. Sugimoto, T. Ramamurthy, S. M. Faruque, G. B. Nair, and S. Yamasaki. 2007. An inducible lambdaoid prophage encoding cytolethal distending toxin (CDT-I), and a type III effector protein in enteropathogenic *Escherichia coli*. Proc. Natl. Acad. Sci. 104: 14483-14488.
  28. Pazhani, G. P., S. K. Niyogi, A. K. Singh, B. Sen, N. Taneja, M. Kundu, S. Yamasaki, and T. Ramamurthy. 2008. Molecular characterization of multi-drug resistant *Shigella* spp isolated from epidemic and endemic cases of shigellosis. J. Med. Microbiol. 57:856-863.

29. Ramamurthy, T. 2008. Shiga toxin-producing *Escherichia coli* (STEC): the bug in our backyard. *Indian J. Med. Res.* 128: 233-236.
30. Mahalanabis, D., T. Ramamurthy, G. B. Nair, A. Ghosh, S. Shaikh, B. Sen M. Thungapathra, R. K. Ghosh, G. P. Pazhani, R. K. Nandy, S. Jana, S.K. Bhattacharya. 2009. Randomized placebo controlled human volunteer Trial of a Live Oral Cholera Vaccine VA1.3 for safety and immune response. *Vaccine* 27: 4850-4856.
31. Bhowmik, P., P. K. Bag, T. K. Hajra, R. De, P. Sarkar and T. Ramamurthy. 2009. Pathogenic potential of *Aeromonas hydrophila* isolated from surface waters in Kolkata, India. *J. Med. Microbiol.* 58:1549-1558.
32. Ramamurthy, T, and G. B. Nair. 2010. Evolving Identity of epidemic *Vibrio cholerae*: past and the present. *Sci. Cult.* 76: 153-159.
33. Ramamurthy, T., D. Wagener, G. Chowdhury, P. P. Majumder. 2010. A large study on immunological response to a whole-cell killed oral cholera vaccine reveals significant geographical differences in response and that O blood group individuals do not elicit higher response. *Clin. Vaccine. Immunol.* 17: 1232-1237.
34. Rakhi. S. Dey., S. Ghosh, M. Chawla-Sarkar<sup>1</sup>, S. Panchalingam, J. P Nataro, D. Sur, B. Manna, and T. Ramamurthy. 2011. Circulation of a novel pattern of enteric adenovirus serotype-41 among children below 5 years of age in Kolkata, India. *J. Clin. Microbiol.* 49: 500-505.
35. Mousumi Banerjee, G. B. Nair, and T. Ramamurthy. 2011. Molecular Characterization, Toxin Production and Antimicrobial Susceptibility of *Bacillus cereus* Isolated from Acute Diarrheal Patients in Kolkata, India. *Indian J. Med. Res.* 133: 88-95.
36. Ghosh, A., and T. Ramamurthy. 2011. Antimicrobials & cholera: are we stranded? *Indian J. Med. Res.* 133:225-31.
37. Lindsay, B., T. Ramamurthy, S. Sen Gupta, Y. Takeda, K. Rajendran, G. B. Nair, O. C. Stine. 2011. Nonrandom association of diarrheal pathogens in mixed infections. *Emerg. Infect. Dis.* 17: 606-611.
38. Chowdhury. G., G. P. Pazhani, G. B. Nair and T. Ramamurthy. 2011. Transferable plasmid-mediated quinolone resistance in association with extended-spectrum  $\beta$ -lactamases and fluoroquinolone acetylating aminoglycoside-6'-*N*-acetyltransferase in clinical isolates of *Vibrio fluvialis*. *Int. J. Antimicrobiol. Agents.* 38: 169-173.
39. Pazhani, G. P., S. Chakraborty, K. Fujihara, R. K. Nandy, S. Yamasaki, A. Ghosh, G. B. Nair, and T. Ramamurthy. 2011. QRDR mutations, efflux system and antimicrobial resistance genes in enterotoxigenic *Escherichia coli* isolated from an outbreak of diarrhoea in Ahmadabad. *Indian J. Med. Res.* 134: 214-223.
40. Ghosh. S., G. P. Pazhani, G. Chowdhury, S. Guin, S. Dutta, K. Ranjendran, M. K. Bhattacharya, Y. Takeda, S. K. Niyogi, G. Balakrish Nair, and T. Ramamurthy. 2011. Genetic characteristics and changing antimicrobial resistance patterns among *Shigella* spp isolated from hospitalized diarrheal patients in Kolkata, India. *J. Med. Microbiol.* 60: 1460-1466.
41. Mutreja, A., D. W. Kim, N. R. Thomson, T. R. Connor, J. H. Lee, S. Kariuki, N. J. Croucher, S. Y. Choi, S. R. Harris, M. Lebens, S. K. Niyogi, E. J. Kim, T. Ramamurthy, J. Chun, J. L. Wood,

- J. D. Clemens, C. Czerkinsky, G. B. Nair, J. Holmgren, J. Parkhill, G. Dougan. 2011. Evidence for several waves of global transmission in the seventh cholera pandemic. *Nature*. 477:462-465.
42. Chowdhury, G., G. P. Pazhani, D. Dutta, S. Guin, S. Dutta, S. Ghosh, H. Izumiya, M. Asakura, S. Yamasaki, Y. Takeda, E. Arakawa, H. Watanabe, A. K. Mukhopadhyay, M. K. Bhattacharya, K. Rajendran, G. B. Nair, and T. Ramamurthy. *Vibrio fluvialis* in Patients with Diarrhea, Kolkata, India. *Emerg. Infect. Dis.* 18: 1868-1871.
  43. Panchalingam, S., M. Antonio, A. Hossain, I. Mandomando, B. Ochieng, J. Oundo, T. Ramamurthy, B. Tamboura, A. K. M. Zaidi, W. Petri, E. Houpt, P. Murray, V. Prado, R. Vidal, D. Steele, N. Strockbine, P. Sansonetti, R. I. Glass, R. M. Robins-Browne, M. Tauschek, A. M. Svennerholm, K. Kotloff, M. M. Levine, and J. P. Nataro. 2012. Diagnostic microbiologic methods in the GEMS-1 case/control study. *Clin. Infect. Dis.* 55:S294-302.
  44. Awasthi, S., M. Asakura, N. Chowdhury, S. Neogi, A. Hinenoya, H. Golbar, J. Yamate, E. Arakawa, T. Ramamurthy, and S. Yamasaki. 2013. Novel cholix toxin variants, an ADP-ribosylating toxin in *Vibrio cholerae* non-O1/non-O139 strains and their pathogenicity. *Infect. Immun.* 81: 531-541.
  45. Dutta, S., S. Guin, S. Ghosh, G. P. Pazhani, K. Rajendran, M. K. Bhattacharya, Y. Takeda, G. B. Nair and T. Ramamurthy. 2013. Trends in the Prevalence of diarrheagenic *Escherichia coli* among hospitalized diarrheal patients in Kolkata, India. *PLoS One*. 8:e56068.
  46. Dutta, D., G. Chowdhury, G. P. Pazhani, S. Guin, S. Dutta, S. Ghosh, K. Rajendran, R. K. Nandy, A. K. Mukhopadhyay, M. K. Bhattacharya, U. Mitra, Y. Takeda, G. B. Nair and T. Ramamurthy. *Vibrio cholerae* non-O1, non-O139 serogroups and cholera-like diarrhea, Kolkata, India. *Emerg. Infect. Dis.* 19: 464-467.
  47. Ramamurthy, D., G. P. Pazhani, A. Sarkar, R. K. Nandy, K. Rajendran, D. Sur, B. Manna, and T. Ramamurthy. 2013. Case-control study on the role of enterotoxigenic *Bacteroides fragilis* as a cause of diarrhea in children in Kolkata, India. *PLoS One* 8(4): e60622.
  48. Chowdhury, G., S. Ghosh, G. P. Pazhani, B. K. Paul, D. Maji, A. K. Mukhopadhyay, and T. Ramamurthy. 2013. Isolation and characterization of pandemic and nonpandemic strains of *Vibrio parahaemolyticus* from an outbreak of diarrhea in North 24 Parganas, West Bengal, India. *Foodborne Pathog. Dis.* 10: 338-342.
  49. Kotloff, K. L., J. P. Nataro, W. C. Blackwelder, D. Nasrin, T. H. Farag, S. Panchalingam, Y. Wu, S. O. Sow, D. Sur, R. F. Breiman, A. S. Faruque, A. K. Zaidi, D. Saha, P. L. Alonso, B. Tamboura, D. Sanogo, U. Onwuchekwa, B. Manna, T. Ramamurthy, S. Kanungo, J. B. Ochieng, R. Omere, J. O. Oundo, A. Hossain, S. K. Das, S. Ahmed, S. Qureshi, F. Quadri, R. A. Adegbola, M. Antonio, M. J. Hossain, A. Akinsola, I. Mandomando, T. Nhampossa, S. Acácio, K. Biswas, C. E. O'Reilly, E. D. Mintz, L. Y. Berkeley, K. Muhsen, H. Sommerfelt, R. M. Robins-Browne, and M. M. Levine. 2013. Burden and aetiology of diarrhoeal disease in infants and young children in developing countries (the Global Enteric Multicenter Study, GEMS): a prospective, case-control study. *Lancet*. 382: 209-222.
  50. Chowdhury, G., A. Sarkar, G. P. Pazhani, A. K. Mukhopadhyay, M. K. Bhattacharya, and T. Ramamurthy. 2013. An outbreak of foodborne gastroenteritis caused by dual pathogens, *Salmonella enterica* serovar Weltevreden and *Vibrio fluvialis* in Kolkata, India. *Foodborne Pathog. Dis.* 10: 904-906.

51. Ramamurthy, T., G. Chowdhury, G. P. Pazhani, and S. Shinoda. 2014. *Vibrio fluvialis*: an emerging pathogen. *Front. Microbiology*. Mar 7;5:91. 5: doi: 10.3389/fmicb.2014.00091
52. Pazhani, G. P., S. K. Bhowmik, S. Ghosh, S. Guin, S. Dutta, K. Rajendran, D. R. Saha, R. K. Nandy, M. K. Bhattacharya, A. K. Mukhopadhyay and T. Ramamurthy. 2014. Trends in the epidemiology of pandemic and non-pandemic strains of *Vibrio parahaemolyticus* isolated from diarrheal patients in Kolkata, India. *Plos. Neg. Trop. Dis.* 1;8(5):e2815.
53. Ramamurthy, T., and N. C. Sharma. 2014. Cholera outbreaks in India. *Curr. Top. Microbiol. Immunol.* 379: 49-85.
54. Ghosh, S., G. P. Pazhani, S. K. Niyogi, J. P. Nataro, and T. Ramamurthy. 2014. Genetic characterization of *Shigella* species isolated from diarrhoeal and asymptomatic children from Kolkata, India. *J. Med. Microbiol.* 63: 903-910.
55. Ramamurthy, T., A. Ghosh, G. P. Pazhani and S. Shinoda. 2014. Current perspectives on viable but non-culturable (VBNC) pathogenic bacteria. *Front. Microbiol.* 2:103. doi: 10.3389.
56. Ghosh, A., A. Sarkar, G. Chowdhury, G. P. Pazhani and T. Ramamurthy. 2014. Over view on the New Delhi metallo- $\beta$ -lactamase (NDM)-producers. *Proc. Indian Nat. Sci. Acad.* 80: 547-563.
57. Livio, S., N. Strockbine, S. Panchalingam, S. M. Tennant, E. M. Barry, M. E. Marohn, M. Antonio, A. Hossain, I. Mandomando, J. B. Ochieng, J. O. Oundo, S. Qureshi, T. Ramamurthy, B. Tamboura, R. A. Adegbola, M. J. Hossain, D. Saha, S. Sen, A. S. Faruque, P. L. Alonso, R. F. Breiman, A. K. Zaidi, D. Sur, S. O. Sow, L. Y. Berkeley, C. O'Reilly, E. D. Mintz, K. Biswas, D. Cohen, T. H. Farag, D. Nasrin, Y. Wu, W. C. Blackwelder, K. L. Kotloff, J. P. Nataro, M. M. Levine. 2014. *Shigella* isolates from the Global Enteric Multicenter Study (GEMS) inform vaccine development. *Clin. Infect. Dis.* 59: 933-941.
58. Calcuttawala, F., C. Hariharan, G. P. Pazhani, S. Ghosh, T. Ramamurthy. 2015. Activity spectrum of colicins produced by *Shigella sonnei* and genetic mechanism of colicin resistance in conspecific strains and *Escherichia coli*. *Antimicrob Agents Chemother.* 59: 152-158.
59. Dutta, S., G. P. Pazhani J. P. Nataro, T. Ramamurthy. 2015. Heterogenic virulence in a diarrheagenic *Escherichia coli*: Evidence for an EPEC expressing heat-labile toxin of ETEC. *Int. J. Med. Microbiol.* 305: 47-54.
60. Sarkar, A, G. P. Pazhani, R. Dharanidharan, A. Ghosh, and T. Ramamurthy. 2015. Detection of integron-associated gene cassettes and other antimicrobial resistance genes in enterotoxigenic *Bacteroides fragilis*. *Anaerobe.* 33: 18-24.

## BOOK CHAPTERS

1. Garg, P., T. Ramamurthy, A. Ghosh, S. K. Bhattacharya, Y. Takeda, and G. B. Nair. 1998. Molecular shifts within clonal populations of *Vibrio cholerae* O1 and O139 and its impact on the persistence and spread of cholera. *In: Molecular Intervention in Disease. Proceedings of the Fifth Annual Ranbaxy Science Foundation Symposium.* S. Gupta and O.P. Sood (eds). pp. 43-49.
2. Nair, G. B., T. Ramamurthy, S. K. Bhattacharya, R. K. Ghosh, M. Thungapathra and A. Ghosh. 2002. The development and value of cholera vaccines. *In. Proceeding on "Trends in Malaria and Vaccine Research".* D. Raghunath and R. Nayak. (Eds). Pp.163-173.



3. Ramamurthy, T., S. C. Das, A. Khan, S. Chakraborty, S. K. Bhattacharya, and G. B. Nair. 2003. Molecular attributes of Shiga toxin-producing *Escherichia coli*-A new vista. *In: The Proceedings of the Second Annual Conference of Indian Association of Veterinary Public Health Specialists.*
4. Nair, G. B., S. M. Faruque, P. Garg, T. Ramamurthy, and Y. Takeda. 2004. Molecular epidemiology of *Vibrio cholerae*: Masquerade of a deceptive pathogen. *In: Ecological Destruction, Health, and Development: Advancing Asian Paradigms.* Hisao Furukawa, Mitsuaki Nishibuchi,, Yasuyuki Kono, and Yoshihiro Kaida (Eds). Kyoto University Press. pp. 231-250.
5. T. Ramamurthy. 2008. Antibiotic resistance in *Vibrio cholerae*. *In: Vibrio cholerae: Genomics and Molecular Biology.* Shah M. Faruque and G. Balakrish Nair (Editors). Caister Academic Press, UK. pp . 191-207.
6. Yamasaki, S., M. Asakura, S. Shiramaru, S. B. Neogi, A. Hinenoya, W. Samosornsuk, S. Lei, and T. Ramamurthy. 2010. Molecular epidemiology of *Vibrio cholerae* and campylobacters isolated in Asian Countries. *In: Current Topics of Infectious Diseases in Japan and Asia.* Springer, Japan pp. 25-43.
7. Mukhopadhyay, A. K, and T. Ramamurthy. 2010. Cholera: Mole Hills and Mountains. *In: Epidemiological and Molecular Aspects on Cholera.* T. Ramamurthy and S.K. Bhattacharya (Eds). Springer, New York. pp 5-29.
8. Sow, S., M. Antonio, J. O. Oundo, I. Mandomando, and T. Ramamurthy. 2010. Endemic and Epidemic Cholera in Africa. *In: Epidemiological and Molecular Aspects on Cholera.* T. Ramamurthy and S.K. Bhattacharya (Eds). Springer, New York. pp 31-50.
9. Ghosh, A, and T. Ramamurthy. 2010. Integron-mediated antimicrobial resistance in *Vibrio cholera*. *In: Epidemiological and Molecular Aspects on Cholera.* T. Ramamurthy and S.K. Bhattacharya (Eds). Springer, New York. USA. pp 291-310.
10. T. Ramamurthy and M. John Albert. 2012. Epidemiology, pathogenesis and genetics of diarrhoeagenic *Escherichia coli* infections. *In: Foodborne and Waterborne Bacterial Pathogens: Epidemiology, Evolution and Molecular Biology.* Shah M. Faruque (Ed). Caister Academic Press, UK. pp 11-61.
11. G. P. Pazhani and T. Ramamurthy. 2012. Molecular pathogenesis, epidemiology and drug resistance of *Shigella* species. *In: Foodborne and Waterborne Bacterial Pathogens: Epidemiology, Evolution and Molecular Biology.* Shah M. Faruque (Ed). Caister Academic Press, UK. pp.77-112.
12. Nair G. B., N. Hajela, T. Ramamurthy, and Y. Tekeda. 2012. Probiotics and diarrhea in low and Middle income countries. *In: Helath Impact of Probiotics: Vision and Opportunities.* G. Balakrish Nair and Yoshifumi Takeda (Eds). Elsevier, New Delhi, India, pp. 36-46.
13. Ramamurthy, T., A. K. Mukhopadhyay, R. K. Nandy, and G. Balakrish Nair. 2012. Molecular Typing of *Vibrio cholerae*: Imprints in the Epidemiology of Cholera. *In: Molecular Typing of Bacterial Infections.* Marian L. McKee and Ivano de Filippis (Eds). Springer, New York.USA. pp. 53-72.
14. Ramamurthy, T. and G. Balakrish Nair. 2014. Chapter 117. *Vibrio cholerae*. *In: Encyclopedia of*

Food Safety. Y. Motarjemi (Ed). Academic Press Waltham, MA. Vol: 1: 546-554.

15. Ramamurthy, T. and G. Balakrish Nair. 2014. Chapter 118. *Vibrio parahaemolyticus*. In: Encyclopedia of Food Safety. Y. Motarjemi (Ed). Academic Press Waltham, MA. Vol: 1: 555-563.

#### **EDITED BOOKS:**

1. Epidemiological and Molecular Aspects on Cholera. 2010. T. Ramamurthy and S.K. Bhattacharya (Eds). Springer, New York.
2. Dr. Asoke C. Ghose and T. Ramamurthy (Guest Editors). Indian Journal of Medical Research. Special issue on Fifty years of discovery of cholera toxin by S. N. De. February 2011