

## Curriculum Vitae



### Professor Shah M. Faruque, PhD

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Dhaka-1229, Bangladesh

**Present Position** Professor of Microbiology  
Independent University Bangladesh (IUB)

### Education

Year	Degree	Institution
1978	B.Sc. (Honours)	University of Dhaka
1979	M.Sc.	University of Dhaka
1988	Ph.D.	University of Reading, England

### Awards, Honours and Professional Memberships

1985-1988	Commonwealth Scholar, University of Reading, England.
2006	TWAS prize-2005 in Medical Sciences
2007	Elected Fellow, TWAS: The World Academy of Sciences
2006	Elected Fellow, Bangladesh Academy of Sciences
2008	Member, International Society for Infectious Diseases
2005	Member, Association of Vibrio Biologists
2010-2014	Member VibrioNet Consortium, Germany
1996-2007	Senior Associate, Department of International Health, Johns Hopkins University

## **Academic, Research and Administrative Employment**

2018-present	Professor of Microbiology, Independent University Bangladesh
2017-2018	Professor of Microbiology and Biotechnology, BRAC University
2015-2017	*Director, Genomics Centre, icddr,b
2012- 2015	*Director, Centre for Food and Water Borne Diseases, icddr,b
2008- 2011	*Head of Molecular Genetics and Senior Scientist icddr,b
1997- 2007	*Head of Molecular Genetics and Scientist icddr,b
1993-1996	Associate Scientist, icddr,b
1989-1993	Assistant Scientist, icddr,b
1988-1989	Assistant Professor, Department of Biochemistry, University of Dhaka
1984-1988	Lecturer, Department of Biochemistry, University of Dhaka

Note: \*(These positions are International Professional Positions)

## **Other Academic Appointments**

2010	Part-time Professor, Department of Life Sciences, North South University.
2012-2014	Part-time Professor, Department of Genetic Engineering & Biotechnology, University of Dhaka
2015	Special Guest Professor, Graduate School of Life and Environmental Sciences, Osaka Prefecture University, Japan

## **Interactions with International Universities/Institutes and Laboratories**

Welcome Trust Sanger Institute, Hinxton, Cambridge, UK  
Graduate School of Life and Environmental Sciences, Osaka Prefecture University, Japan  
Department of Microbiology and Immunobiology, Harvard Medical School, Boston USA  
National Institute of Cholera and Enteric Diseases, Kolkata, India  
Oxford University Clinical research Unit, Ho Chi Minh City, Vietnam  
Department of Microbiology, Faculty of Public Health, Mahidol University, Thailand

## **Administrative Experience**

Worked in various capacities that involve significant management and administrative tasks. These include positions such as the Director of the Centre for Food and Waterborne Diseases, and Director of Genomics Centre icddr,b. These positions involve dynamic leadership and management of research students and scientists in terms of their assignments, evaluation and related issues. As the interim head of Laboratory Operations Management in icddr,b I also gathered experience in running diagnostic laboratories maintaining the desired standard of service, biosafety and quality control, as well as deal with team management and business strategies. Besides, as Principal Investigator (PI) of various research projects for more than 20 years, I have been supervising both administrative and scientific aspects of these projects.

## Mentoring Research Students.

Supervised numerous students in developing their research skills. Many of my students have obtained overseas scholarships, completed Ph.D. and M.Sc. degrees, and are holding various research/academic positions in home and abroad.

## International Recognition

- TWAS prize-2005 in Medical Sciences, awarded by The World Academy of Sciences in Italy
- Senior Investigator Award by the Wellcome Trust, in UK.
- Elected Fellow of TWAS, as well as a Fellow of the Bangladesh Academy of Sciences.
- Senior Associate in the Department of International Health, Johns Hopkins University, USA.

## List of Research Publications

### Original Research Papers

1. Naser, IB, Hoque, MM, Ausrafuggaman MN, Tareq TM, Rocky MM, **Faruque SM**. 2017. Analysis of the CRISPR-Cas system in bacteriophages active on epidemic strains of *Vibrio cholera* in Bangladesh. Scientific Reports. 7: 14880, DOI:10.1038/s41598-017-14839-2
2. Islam MA, Islam M, Hasan R, Hossain MI, Nabi A, Rahman M, Goessens WHF, Endtz HP, Boehm AB, **Faruque SM**. 2017. Environmental Spread of New Delhi Metallo- $\beta$ -Lactamase-1-Producing Multidrug-Resistant Bacteria in Dhaka, Bangladesh. Appl Environ Microbiol. 283(15). pii: e00793-17. doi: 10.1128/AEM.00793-17. PMID:28526792
3. Naser IB, Hoque MM, Abdullah A, Bari SMN, Ghosh AN, **Faruque SM**. 2017. Environmental bacteriophages active on biofilms and planktonic forms of toxigenic *Vibrio cholerae*: Potential relevance in cholera epidemiology. PLoS One.12(7):e0180838. doi: 10.1371/journal.pone.0180838. PMID:28700707
4. Hoque MM, Naser IB, Bari SM, Zhu J, Mekalanos JJ, **Faruque SM**. 2016. Quorum Regulated Resistance of *Vibrio cholerae* against Environmental Bacteriophages. Sci Rep. 6:37956. doi: 10.1038/srep37956.PMID:27892495
5. Zahid MS, Awasthi SP, Asakura M, Chatterjee S, Hinenoya A, **Faruque SM**, Yamasaki S. 2015. Suppression of virulence of toxigenic *Vibrio cholerae* by anethole through the cyclic AMP (cAMP)-cAMP receptor protein signaling system. PLoS One. 10(9):e0137529. PMID: 26361388
6. Connor TR, Barker CR, Baker KS, Weill FX, Talukder KA, Smith AM, Baker S, Gouali M, Pham Thanh D, Jahan Azmi I, Dias da Silveira W, Semmler T, Wieler LH, Jenkins C, Cravioto A, **Faruque SM**, Parkhill J, Wook Kim D, Keddy KH, Thomson NR. 2015. Species-wide whole genome sequencing reveals historical global spread and recent local persistence in *Shigella flexneri*. elife. 4:e07335. PMID: 26238191
7. Baker KS, Dallman TJ, Ashton PM, Day M, Hughes G, Crook PD, Gilbert VL, Zittermann S, Allen VG, Howden BP, Tomita T, Valcanis M, Harris SR, Connor TR, Sintchenko V, Howard P, Brown JD, Petty NK, Gouali M, Thanh DP, Keddy KH, Smith AM, Talukder KA, **Faruque SM**, Parkhill J,

- Baker S, Weill FX, Jenkins C, Thomson NR. 2015. Intercontinental dissemination of azithromycin-resistant shigellosis through sexual transmission: a cross-sectional study. *Lancet Infect Dis.* 15(8):913-21. PMID:25936611
8. Mahmud ZH, Islam S, Zaman RU, Akter M, Talukder KA, Bardhan PK, Khan AI, Rhodes FC, Kamara A, Wurie IM, Alemu W, Jambai A, **Faruque SM**, Clemens JD, Islam MS. 2014. Phenotypic and genotypic characteristics of *Vibrio cholerae* O1 isolated from the Sierra Leone cholera outbreak in 2012. *Trans R Soc Trop Med Hyg.* 108(11):715-20.
  9. Azmi IJ, Khajanchi BK, Akter F, Hasan TN, Shahnaij M, Akter M, Banik A, Sultana H, Hossain MA, Ahmed MK, **Faruque SM**, Talukder KA. 2014. Fluoroquinolone resistance mechanisms of *Shigella flexneri* isolated in Bangladesh. *PLoS One.* 9(7):e102533. PMID: 25028972
  10. Kamruzzaman M, Robins WP, Bari SM, Nahar S, Mekalanos JJ, **Faruque SM**. 2014. RS1 satellite phage promotes diversity of toxigenic *Vibrio cholerae* by driving CTX prophage loss and elimination of lysogenic immunity. *Infect Immun.* 82(9):3636-3643. PMID:24935981
  11. Hinenoya A, Shima K, Asakura M, Nishimura K, Tsukamoto T, Ooka T, Hayashi T, Ramamurthy T, **Faruque SM**, Yamasaki S. Molecular characterization of cytolethal distending toxin gene-positive *Escherichia coli* from healthy cattle and swine in Nara, Japan. *BMC Microbiol.* 2014; 14:97. doi: 10.1186/1471-2180-14-97.
  12. Schirmeister F, Dieckmann R, Bechlars S, Bier N, **Faruque SM**, Strauch E. Genetic and phenotypic analysis of *Vibrio cholerae* non-O1, non-O139 isolated from German and Austrian patients. *Eur J Clin Microbiol Infect Dis.* 2014; 33:767-78.
  13. Robins WP, **Faruque SM**, Mekalanos JJ. Coupling mutagenesis and parallel deep sequencing to probe essential residues in a genome or gene. *Proc Natl Acad Sci U S A.* 110:E848-857. doi: 10.1073/pnas.1222538110. 2013.
  14. Bari SM, Roky MK, Mohiuddin M, Kamruzzaman M, Mekalanos JJ, and **Faruque SM**. Quorum-sensing autoinducers resuscitate dormant *Vibrio cholerae* in environmental water samples. *Proc Natl Acad Sci USA.* 110:9926-9931; 2013.
  15. Seed, KD, **Faruque, SM**, Mekalanos, JJ, Calderwood, SB, Qadri F, and Camilli, A. Phase variable O antigen biosynthetic genes control expression of the major protective antigen and bacteriophage receptor in *Vibrio cholerae* O1. *PLoS Pathog.* 8:e1002917. doi: 10.1371/journal.ppat.1002917. 2012.
  16. Kamruzzaman M, Shoma S, Bari SM, Ginn AN, Wiklendt AM, Partridge SR, **Faruque SM**, Iredell JR. Genetic diversity and antibiotic resistance in *Escherichia coli* from environmental surface water in Dhaka City, Bangladesh. *Diagn. Microbiol. Infect. Dis.* doi:pii: S0732-8893(13)00112-0. 2013.
  17. Kamruzzaman M, Bari SM, **Faruque SM**. In vitro and in vivo bactericidal activity of *Vitex negundo* leaf extract against diverse multidrug resistant enteric bacterial pathogens. *Asian Pac J Trop Med.* May 13;6(5):352-359. 2013
  18. Zahid MS, Waise Z, Kamruzzaman M, Ghosh AN, Nair GB, Khairul Bashar SA, Mekalanos JJ, and **Faruque SM**. An experimental study of phage mediated bactericidal selection & emergence of the El Tor *Vibrio cholerae*. *Indian J Med Res.* 133:218-24, 2011.

19. Shima A, Hinenoya A, Asakura M, Sugimoto N, Tsukamoto T, Ito H, Nagita A, **Faruque SM**, Yamasaki S. Molecular characterizations of cytolethal distending toxin produced by *Providencia alcalifaciens* strains isolated from patients with diarrhea. *Infect Immun.* 80:1323-32; 2012.
20. Tam VC, Suzuki M, Coughlin M, Saslowsky D, Biswas K, Lencer WI, **Faruque SM**, Mekalanos JJ. Functional analysis of VopF activity required for colonization in *Vibrio cholerae*. *MBio.* 1(5). pii:e00289-10; 2010.
21. Islam MS, Mahmud ZH, Ansaruzzaman M, **Faruque SM**, Talukder KA, Qadri F, Alam M, Islam S, Bardhan PK, Mazumder RN, Khan AI, Ahmed S, Iqbal A, Chitsatso O, Mudzori J, Patel S, Midzi SM, Charimari L, Endtz HP, Cravioto A. Phenotypic, genotypic, and antibiotic sensitivity patterns of strains isolated from the cholera epidemic in Zimbabwe. *J Clin Microbiol.* 49:2325-2327; 2011.
22. Hassan, F., Kamruzzaman, M., Mekalanos, JJ, and **Faruque, SM**. Satellite phage TLC $\phi$  enables toxigenic conversion by CTX phage through *dif* site alteration. *Nature* 467:982-985, 2010.
23. Kamruzzaman M, Udden SM, Cameron DE, Calderwood SB, Nair GB, Mekalanos JJ, **Faruque SM**. Quorum-regulated biofilms enhance the development of conditionally viable, environmental *Vibrio cholerae*. *Proc. Natl. Acad. Sci. U S A. (PNAS)* 107:1588-93. 2010.
24. Zahid MS, Waise TM, Kamruzzaman M, Ghosh AN, Nair GB, Mekalanos JJ, **Faruque SM**. The cyclic AMP (cAMP)-cAMP receptor protein signaling system mediates resistance of vibrio cholerae O1 strains to multiple environmental bacteriophages. *Appl Environ Microbiol.* 76:4233-4240; 2010.
25. Chowdhury N, Asakura M, Neogi SB, Hinenoya A, Haldar S, Ramamurthy T, Sarkar BL, **Faruque SM**, Yamasaki S. Development of simple and rapid PCR-fingerprinting methods for *Vibrio cholerae* on the basis of genetic diversity of the superintegron. *J Appl. Microbiol.* 109:304-312; 2010.
26. Siddique AK, Nair GB, Alam M, Sack DA, Huq A, Nizam A, Longini IM, Qadri F, **Faruque SM**, Colwell RR, Ahmed S, Iqbal A, Bhuiyan NA, Sack RB. El Tor cholera with severe disease: a new threat to Asia and beyond. *Epidemiol. Infect.* 14:1-6, 2009
27. Hinenoya A, Naigita A, Ninomiya K, Asakura M, Shima K, Seto K, Tsukamoto T, Ramamurthy T, **Faruque SM**, Yamasaki S. Prevalence and characteristics of cytolethal distending toxin-producing *Escherichia coli* from children with diarrhea in Japan. *Microbiol Immunol.* 53:206-215; 2009.
28. Udden SMN, Zahid MSH, Biswas K, Ahmad QS, Cravioto A, Nair GB, Mekalanos JJ, **Faruque SM**. Acquisition of classical CTX prophage from *Vibrio cholerae* O141 by El Tor strains aided by lytic phages and chitin-induced competence. *Proc. Natl. Acad. Sci USA (PNAS)* 23:11951-11958; 2008.
29. Zahid MS, Udden SM, Faruque AS, Calderwood SB, Mekalanos JJ, **Faruque SM**. Effect of phage on the infectivity of *Vibrio cholerae* and emergence of genetic variants. *Infect Immun.* 76:5266-73; 2008.
30. Rahman MH, Biwas K, Hossain MA, Sack RB, Mekalanos JJ, **Faruque SM**. Distribution of Genes for Virulence and Ecological Fitness among Diverse *Vibrio cholerae* Population in a Cholera

Endemic Area: Tracking the Evolution of Pathogenic Strains. *DNA & Cell Biol.* 27:347-355. 2008.

31. **Faruque SM**, Tam VC, Chowdhury N, Diraphat P, Dziejman M, Heidelberg JF, Clemens JD, Mekalanos JJ, Nair GB. Genomic Analysis of the Mozambique Strain of *Vibrio cholerae* O1 reveals the origin of El Tor strains carrying classical CTX prophage. *Proc Natl Acad Sci USA (PNAS)* 104:5151-5156. 2007.
32. Asakura, M., Hinenoya, A., Alam, M.S., Shima, K., Zahid, S.H., Shi, L., Sugimoto, N., Ghosh, A.N., Ramamurthy, T., **Faruque, S.M.**, Nair G.B., and Yamasaki, S. An inducible lambdoid prophage encoding cytolethal distending toxin (Cdt-I) and a type III effector protein in enteropathogenic *Escherichia coli*. *Proc. Natl. Acad. Sci. USA (PNAS)* 104:14483-14488. 2007.
33. Qadri F, Chowdhury MI, **Faruque SM**, Salam MA, Ahmed T, Begum YA, Saha A, Al Tarique A, Seidlein LV, Park E, Killeen KP, Mekalanos JJ, Clemens JD, Sack DA; the PXV Study Group. Peru-15, a live attenuated oral cholera vaccine, is safe and immunogenic in Bangladeshi toddlers and infants. *Vaccine.* 25:231-238. 2007
34. **Faruque SM**, Biswas K, Udden SM, Ahmad QS, Sack DA, Nair GB, Mekalanos JJ Transmissibility of cholera: in vivo-formed biofilms and their relationship to infectivity and persistence in the environment. *Proc. Natl. Acad. Sci. U S A. (PNAS)* 103:6350-6355. 2006.
35. **Faruque SM**, Islam MJ, Ahmad QS, Biswas K, Faruque AS, Nair GB, Sack RB, Sack DA, Mekalanos JJ. An improved technique for isolation of environmental *Vibrio cholerae* with epidemic potential: monitoring the emergence of a multiple-antibiotic-resistant epidemic strain in Bangladesh. *J. Infect. Dis.* 193:1029-1036. 2006.
36. Jensen MA, **Faruque SM**, Mekalanos JJ, Levin BR. Modeling the role of bacteriophage in the control of cholera outbreaks *Proc. Natl. Acad. Sci. USA. (PNAS)* 103:4652-4657. 2006.
37. Butler SM, Nelson EJ, Chowdhury N, **Faruque SM**, Calderwood SB, Camilli A. Cholera stool bacteria repress chemotaxis to increase infectivity. *Mol. Microbiol.* 60:417-426. 2006.
38. Hasan, KZ, Pathela, P, Alam, K, Podder, G, **Faruque, SM**, Roy, E, Haque, AK, Haque, R, Albert, MJ, Siddique, AK, Sack, RB. Aetiology of diarrhoea in a birth cohort of children aged 0-2 year(s) in rural Mirzapur, Bangladesh. *J. Health Popul. Nutr.* 24:25-35. 2006.
39. Nair G.B., Qadri, F., Holmgren, J., Svennerholm, AM, Safa, A., Bhuiyan, N.A., Ahmad, Q.S., **Faruque, S.M.**, Faruque, A.S.G., Takeda, Y., and Sack, D.A. Cholera Due to Altered El Tor Strains of *Vibrio cholerae* O1 in Bangladesh. *J. Clin. Microbiol.* 44, 4211-4213. 2006.
40. Alam M, Nur-A-Hasan, Ahsan S, Pazhani GP, Tamura K, Ramamurthy T, Gomes DJ, Rahman SR, Islam A, Akhtar F, Shinoda S, Watanabe H, **Faruque SM**, Nair GB. Phenotypic and Molecular Characteristics of *Escherichia coli* Isolated from Aquatic Environment of Bangladesh. *Microbiol. Immunol.* 50:359-370; 2006.
41. **Faruque SM**, Islam MJ, Ahmad QS, Faruque AS, Sack DA, Nair GB, Mekalanos JJ. Self-limiting nature of seasonal cholera epidemics: Role of host-mediated amplification of phage. *Proc. Natl. Acad. Sci. U S A (PNAS).* 102:6119-6124. 2005.
42. **Faruque, S. M.**, Naser I. B., Fujihara, K., Diraphat, P., Chowdhury, N., Kamruzzaman, M., Qadri, F., Yamasaki, S., Ghosh, A. N. and Mekalanos, J. J. Genomic sequence and receptor for the

*Vibrio cholerae* phage KSF-1Φ: Evolutionary divergence among filamentous vibriophages mediating lateral gene transfer. J. Bacteriol. 187: 4095-4103, 2005.

43. **Faruque SM**, Naser IB, Islam MJ, Faruque AS, Ghosh AN, Nair GB, Sack DA, Mekalanos JJ. Seasonal epidemics of cholera inversely correlate with the prevalence of environmental cholera phages. Proc Natl Acad Sci U S A (PNAS). 102:1702-1707. 2005.
44. Dziejman M, Serruto D, Tam VC, Sturtevant D, Diraphat P, **Faruque SM**, Rahman MH, Heidelberg JF, Decker J, Li L, Montgomery KT, Grills G, Kucherlapati R, Mekalanos JJ. Genomic characterization of non-O1, non-O139 *Vibrio cholerae* reveals genes for a type III secretion system. Proc. Natl. Acad. Sci. U S A. (PNAS) 102:3465-70. 2005.
45. Qadri F, Svennerholm AM, Shamsuzzaman S, Bhuiyan TR, Harris JB, Ghosh AN, Nair GB, Weintraub A, **Faruque SM**, Ryan ET, Sack DA, Calderwood SB. Reduction in capsular content and enhanced bacterial susceptibility to serum killing of *Vibrio cholerae* O139 associated with the 2002 cholera epidemic in Bangladesh. Infect. Immun. 73:6577-6583. 2005.
46. Larocque RC, Harris JB, Dziejman M, Li X, Khan AI, Faruque AS, **Faruque SM**, Nair GB, Ryan ET, Qadri F, Mekalanos JJ, Calderwood SB. Transcriptional profiling of *Vibrio cholerae* recovered directly from patient specimens during early and late stages of human infection. Infect. Immun. 73:4488-93. 2005.
47. Qadri F, Chowdhury MI, **Faruque SM**, Salam MA, Ahmed T, Begum YA, Saha A, Alam MS, Zaman K, Seidlein LV, Park E, Killeen KP, Mekalanos JJ, Clemens JD, Sack DA; Peru-15 Study Group. Randomized, controlled study of the safety and immunogenicity of Peru-15, a live attenuated oral vaccine candidate for cholera, in adult volunteers in Bangladesh. J. Infect. Dis. 192:573-9; 2005.
48. **Faruque SM**, Chowdhury N, Kamruzzaman M, Dziejman M, Rahman MH, Sack, DA, Nair GB, Mekalanos JJ. Genetic diversity and virulence potential of environmental *Vibrio cholerae* population in a cholera-endemic area. Proc. Natl. Acad. Sci., USA (PNAS). 101:2123-2128; 2004.
49. Nusrin S, Khan GY, Bhuiyan NA, Ansaruzzaman M, Hossain MA, Safa A, Khan R, **Faruque SM**, Sack DA, Hamabata T, Takeda Y, Nair GB. Diverse CTX phages among toxigenic *Vibrio cholerae* O1 and O139 strains isolated between 1994 and 2002 in an area where cholera is endemic in Bangladesh. J. Clin. Microbiol. 12:5854-5856; 2004.
50. De K, Ramamurthy T, **Faruque SM**, Yamasaki S, Takeda Y, Nair GB, Nandy RK. Molecular characterisation of rough strains of *Vibrio cholerae* isolated from diarrhoeal cases in India and their comparison to smooth strains. FEMS Microbiol. Lett. 232: 23-30; 2004.
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52. **Faruque SM**, Zhu J, Kamruzzaman M., Asadulghani, Mekalanos JJ. Examination of diverse TCP positive *Vibrio cholerae* strains fails to demonstrate evidence for the VPI phage. Infect. Immun. 71: 2993-2999; 2003.

53. **Faruque SM**, Kamruzzaman M., Asadulghani, Sack DA, Mekalanos JJ, Nair GB. CTX phage-Independent Production of RS1 Satellite Phage by *Vibrio cholerae*. Proc. Natl. Acad. Sci., USA (PNAS). 100:1280-1285. 2003.
54. **Faruque SM**, Kamruzzaman M, Meraj, IM, Chowdhury, N, Nair, GB, Sack, RB, Colwell RR, Sack, DA. Pathogenic Potential of Environmental *Vibrio cholerae* Strains Carrying Genetic Variants of the Toxin-coregulated pilus pathogenicity island. Infect. Immun. 71:1020-1025. 2003.
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60. **Faruque SM**, Khan R, Kamruzzaman M, Yamasaki S, ahmad QS, Azim T, Nair GB, Takeda Y, Sack DA. Isolation of *Shigella dysenteriae* type 1 and *S. flexneri* strains from surface waters in Bangladesh: comparative molecular analysis of environmental *Shigella* isolates versus clinical strains. Appl. Environ. Microbiol. 68:3908-3913. 2002.
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- 69. Faruque SM**, Ahmed KM, Siddique AK, Zaman K, Alim ARMA, Albert MJ. 1997. Molecular analysis of toxigenic *Vibrio cholerae* O139 Bengal isolated in Bangladesh between 1993 and 1996: evidence for the emergence of a new clone of the Bengal vibrios. *J. Clin. Microbiol.* 35:2299-2306; 1997.
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### **Field of Research :**

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Bacteriophage biology and their evolution  
Pathogenicity islands and mobile genetic elements  
Genomics of enteric bacterial pathogens  
Epidemiology, evolution and ecology of enteric pathogens  
Quorum sensing and Biofilms  
Environmental survival forms of pathogenic bacteria