

Dr Shah M Faruque rewarded

TWAS, the Academy of Sciences for the Developing World, formerly the Third World Academy of Sciences, rewarded ICDDR,B scientist Dr Shah M Faruque with the 2005 TWAS Prize in Medical Sciences. The announcement was made at the General Meeting of the Academy in Alexandria in December 2005. He received the prize on 2 September 2006 in Angra dos Reis, 150 km south of Rio de Janeiro, Brazil, during the 40th General Conference. The TWAS Prize is awarded to individual scientists in recognition of outstanding contributions to knowledge in different fields of science.

Dr Faruque's research addresses health problems of developing countries and has contributed significantly to our understanding of natural mechanisms associated with the emergence of bacterial pathogens. Toxigenic *Vibrio cholerae*, the causative agent of cholera epidemics, represents a paradigm for this process in that this organism evolved from environmental non-pathogenic *V. cholerae* by acquisition of virulence genes. Molecular epidemiological surveillance, conducted by Dr Faruque and his co-workers have shown frequent emergence of new toxigenic strains of *V. cholerae*. Series of papers by Dr Faruque and coworkers to describe the molecular analysis of *V. cholerae* and the basis for the origination of new *V. cholerae* strains with epidemic potential have been published in eminent journals.

The major virulence factor produced by *V. cholerae* is cholera toxin which is responsible for the severe diarrhoeal characteristic of cholera. In toxigenic strains, a lysogenic bacteriophage (a virus that infects bacteria) known as CTX phage carries genes for cholera toxin. Faruque and co-workers demonstrated that naturally-occurring toxigenic *V. cholerae* strains can produce CTX phage particles which convert non-toxigenic *V. cholerae* strains into toxigenic strains.



Dr Shah M Faruque (left) working in his laboratory

His group has also contributed substantially to the understanding of molecular mechanisms for the transmission of RS1 satellite phage and has discovered a novel filamentous phage named KSF-1, which can aid in the propagation of cholera toxin-converting phage. Dr Faruque has also done significant work to understand the evolutionary events and selection mechanisms involved in the emergence of epidemic *V. cholerae*. He has added a new dimension to the understanding of the ecology of *V. cholerae* and has proposed models explaining the dynamics of cholera which involves both environmental and host factors.

Research, conducted by Dr Faruque and his associates at ICDDR,B and Harvard University, has greatly elucidated our understanding of the self-limiting nature of cholera epidemics. The results of their studies have revealed that there is an inverse correlation between seasonal epidemics of cholera and the occurrence

of environmental cholera phages. Faruque *et al.* have shown that certain cholera phages kill the bacterium *V. cholerae*. They have further shown that when the balance between phage and bacteria tips in favour of the phage, there is a dramatic decline in numbers of bacteria to a point, where they are no longer able to sustain the epidemic.

Dr Faruque is currently working as an international-level scientist at ICDDR,B and heading the research group on molecular genetics. He collaborates with investigators in different countries, including India, Sweden, Japan, UK, and the USA. Dr Faruque's accomplishment in winning the TWAS Prize has shown that Bangladeshi scientists at ICDDR,B can conduct scientific research comparable in excellence to that of any other laboratory in the world, and this can be also adjudged by as many as nine of his recent research publications in PNAS, one of the top-ranking international journals in science. ■