

Diversity of *V. cholerae* O1 El Tor Strains Producing Classical Type Toxin

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Cholera continues to impose a major toll of both epidemic and endemic disease worldwide, accounting for an estimated 120,000 deaths annually in spite of the advances in rehydration therapy and management [5]. For 2007, WHO reported 180,000 cholera cases worldwide with 4,031 deaths, although the actual number of cases is thought to be much higher due to the unreported cases and the differences in reporting systems of each country [1]. Cholera is caused by a gram-negative toxigenic bacteria *Vibrio cholerae*. More than 200 serogroups of *Vibrio cholerae* are known but only serogroups O1 and O139 cause epidemic and pandemic cholera [5].

The *V. cholerae* O1 serogroup is classified into two biotypes according to different phenotypic traits, the classical biotype and El Tor biotype [2]. The classical biotype strains are believed to have been responsible for the 5th and 6th cholera pandemics in the 20th century, while the current 7th cholera pandemic is due to the El Tor biotype strains [5]. From the late 1990s, El Tor biotype strains producing classical type CT B (hybrid and altered *V. cholerae* strains) began to emerge in south Asian countries (the Indian subcontinent) and lately these strains have entirely replaced the prototype El Tor biotype strains in the area [4]. In 2003, a new variant of El Tor biotype *V. cholerae* strain harboring a tandem repeat of classical CTX prophage was identified in Mozambique; more recently a series of cholera outbreaks in northern Vietnam were also caused by an altered El Tor strain [3].

We have identified various genetic structures of *V. cholerae* strains collected in Mozambique, Vietnam, Bangladesh, and India. Analysis of the CTX phage and RS1 element in hybrid and altered *V. cholera* O1 El Tor strains showed they can be classified into two groups; one containing a tandem repeat of the classical CTX prophage on the small chromosome and the other containing RS1-El Tor CTX prophage harboring classical *ctxB* on the large chromosome.

References

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