List of Tables

Table 1: Genomic classification of DENV.

Table 2: Indian DENV-1 isolates sequenced in present study

Table 3: Indian DENV-2 isolates sequenced in the present study

Table 4: Indian DENV-3 isolates sequenced in the present study

Table 5: Indian DENV-4 isolates sequenced in the present study

Table 6: Indian DENV isolates used for complete genome sequencing in the present study

Table 7: Parameters of BEAUti set for WG and E gene molecular clock analysis.

Table 8: Primers used in the nested Multiplex PCR Serotyping assay.

Table 9: Primers used for amplification and sequencing WG of DENV-1

Table 10: Primers used for amplification and sequencing WG of DENV-2

Table 11: Primers used for amplification and sequencing WG of DENV-3

Table 12: Primers used for amplification and sequencing WG of DENV-4

Table 13: Datasets used for phylogenetic and molecular clock analysis

Table 14: Datasets used for DENV selection pressure analysis

Table 15: Intra lineage diversity in AMAF genotype of DENV-1

Table 16: Inter lineage diversity in AMAF genotype of DENV-1

Table 17: Estimates for different clock models for E gene sequence of DENV-1

Table 18: Estimates from selection pressure analysis of E gene sequence of DENV-1

Table 19: Intra genotype diversity in DENV-2

Table 20: Inter genotype diversity in DENV-2

Table 21: Estimates for different clock models for E gene sequence of DENV-2

Table 22: Estimates from selection pressure analysis of E gene sequence of DENV-2
Table 23: Intra lineage diversity in GIII of DENV-3
Table 24: Inter lineage diversity in GIII of DENV-3
Table 25: Estimates for different clock models for E gene sequence of DENV-3
Table 26: Intra genotype diversity in DENV-4
Table 27: Inter genotype diversity in DENV-4
Table 28: Estimates for different clock models for E gene sequence of DENV-4
Table 29: Complete genome sequence homology among Indian DENV-1 isolates
Table 30: Complete genome sequence homology among Indian DENV-2 isolates
Table 31: Complete genome sequence homology among Indian DENV-3 isolates
Table 32: Complete genome sequence homology among Indian DENV-4 isolates
Table 33: Comparison of sequence diversity within each gene for four serotypes
Table 34: Variation in the aa sequence of Capsid of Indian DENV isolates
Table 35: Variation in the aa sequence of prM of Indian DENV isolates
Table 36: Variation in the aa sequence of E gene among the AMAF lineages of DENV-1
Table 37: Variation in the aa sequence of E gene among Indian isolates of the American and Cosmopolitan genotypes of DENV-2
Table 38: Variation in the aa sequence of E gene among all genotypes of DENV-4
Table 39: Variation in the aa sequence of NS1 of Indian DENV-1 isolates
Table 40: Variation in the aa sequence of NS1 of Indian DENV-2 isolates
Table 41: Variation in the aa sequence of NS1 of Indian DENV-3 isolates
Table 42: Variation in the aa sequence of NS1 of Indian DENV-4 isolates
Table 43: Variation in the aa sequence of NS2A of Indian DENV isolates
Table 44: Variation in the aa sequence of NS2B of Indian DENV isolates
Table 45: Variation in the aa sequence of NS3 of Indian DENV-1 isolates
Table 46: Variation in the aa sequence of NS3 of Indian DENV-2 isolates
Table 47: Variation in the aa sequence of NS3 of Indian DENV-3 isolates
Table 48: Variation in the aa sequence of NS3 of Indian DENV-4 isolates
Table 49: Variation in the aa sequence of NS4A of Indian DENV isolates
Table 50: Variation in the aa sequence of NS4B of Indian DENV isolates
Table 51: Variation in the aa sequence of NS5 of Indian DENV-1 isolates
Table 52: Variation in the aa sequence of NS5 of Indian DENV-2 isolates
Table 53: Variation in the aa sequence of NS5 of Indian DENV-3 isolates
Table 54: Variation in the aa sequence of NS5 of Indian DENV-4 isolates
Table S1: Genbank accession numbers of DENV-1 strains used in the study
Table S2: Genbank accession numbers of DENV-2 strains used in the study
Table S3: Genbank accession numbers of DENV-3 strains used in the study
Table S4: Genbank accession numbers of DENV-4 strains used in the study

List of Figures

Figure 1: Dengue cases in India from 1991 to 2006
Figure 2: Classification of dengue patient
Figure 3: Transmission cycle of DENV
Figure 4: Course of DENV infection and the timings and choices of diagnostic methods
Figure 5: Structure of DENV virion
Figure 6: DENV genome organisation and polyprotein processing
Figure 7: Structure of E protein homodimer.
Figure 8: DENV Replication Cycle
Figure 9: The Processes responsible for increasing the genetic diversity
Figure 10: Regions of recombination identified in DENV genome
Figure 11: Flow chart of the study
Figure 12: Tracer output showing Upper and lower 95% HPD limits.
Figure 13: The factors determining convergence of parameter estimates of a dataset
Figure 14: Bayesian Markov chain Monte Carlo (MCMC) tree using E gene for DENV-1
Figure 15: Bayesian skyline plot for DENV-1 under uncorrelated exponential clock
Figure 16: Bayesian Markov chain Monte Carlo (MCMC) tree using E gene for DENV-2
Figure 17: Bayesian skyline plot for DENV-2 under uncorrelated exponential clock
Figure 18: Bayesian Markov chain Monte Carlo (MCMC) tree using E gene for DENV-3
Figure 19: Bayesian skyline plot for DENV-3 under uncorrelated exponential clock
Figure 20: Simplot analysis indicating genetic exchange in E gene of DENV-3
Figure 21: Bayesian Markov chain Monte Carlo (MCMC) tree using E gene for DENV-4
Figure 22: Bayesian skyline plot for DENV-4 under uncorrelated exponential clock
Figure 23: Simplot analysis indicating breakpoint in E region of DENV-4
Figure 24: Bootscanning analysis to confirm the putative recombinant event in DENV-4
Figure 25: NJ trees showing the changing phylogenetic position of
NIV_793679_India_1979
Figure 26: ML trees derived from complete genome and 10 coding genes of DENV-1
Figure 27: ML trees derived from complete genome and 10 coding genes of DENV-2
Figure 28: ML trees derived from complete genome and 10 coding genes of DENV-3
Figure 29: ML trees derived from complete genome and 10 coding genes of DENV-4