

Rickettsia typhi as Cause of Fatal Encephalitic Typhus in Hospitalized Patients, Hamburg, Germany, 1940–1944

Technical Appendix

Technical Appendix Table. Information on primer and probes used for real-time quantitative PCR of *Rickettsia typhi* *prsA* gene*

PCR primer and probes	Sequence	Primer positioning
<i>R. typhi</i> strain Wilmington AE017197.1 (1)		
Outer-F	5'-GCTTGCAGAAGAATTCTCACTTG-3'	733310–733332
Outer-R	5'-GGTACAGGTTTTTCTCAAGCAC-3'	733488–733510
Inner-F for nested PCR	5'-ACAGCTCAAATGGTGGGGT-3'	733341–733360
Inner-R for nested PCR	5'-TGCCAGCCGAAATCTGTTTTG-3'	733457–733477
<i>R. prowazekii</i> strain Naples-1 CP014865.1 (2)		
Outer-F	5'-GCTTGCAGAAGAATTCTCTCTTG-3'	726697–726719
Outer-R	5'-GGCACAGGTTTTTCTCAAGCAC-3'	726897–726875
Inner-F for nested PCR	5'-CAGCGTCAAATGGTGGGATT-3'	726729–726746
Inner-R for nested PCR	5'-TGCCAACCGAAA CT GTTTTG-3'	726864–726844
Probe (2)		
<i>R. typhi</i>	5'-ATCAATCAGGGCAATTAGTACCAGAA-3'	733381–733406
<i>R. prowazekii</i>	5'-ATCA AC CAGGGCAGTTAGTACCAGAA-3'	726768–726793

*Nucleotides that differ between *R. typhi* and *R. prowazekii* DNA are highlighted in boldface.

CP003398_ <i>R. typhi</i>	gcttgcagaagaattctcacttgataaaagctacagcttcaaatggggttataaggta	60
CP003397_ <i>R. typhi</i>	gcttgcagaagaattctcacttgataaaagctacagcttcaaatggggttataaggta	60
AE017197_ <i>R. typhi</i>	gcttgcagaagaattctcacttgataaaagctacagcttcaaatggggttataaggta	60
Patient 3	gcttgcagaagaattctcacttgataaaagctacagcttcaaatggggttataaggta	60
Patient 5	gcttgcagaagaattctcacttgataaaagctacagcttcaaatggggttataaggta	60
CP014865_ <i>R. prowazekii</i>	gcttgcagaagaattctctcttgataaaagctacagcttcaaatggggttataaggta	60
CP003398_ <i>R. typhi</i>	cattataactaaatcaatcagggcaattagtagtaccagaatttgaaaaataaagcgtttgcatt	120
CP003397_ <i>R. typhi</i>	cattataactaaatcaatcagggcaattagtagtaccagaatttgaaaaataaagcgtttgcatt	120
AE017197_ <i>R. typhi</i>	cattataactaaatcaatcagggcaattagtagtaccagaatttgaaaaataaagcgtttgcatt	120
Patient 3	cattataactaaatcaatcagggcaattagtagtaccagaatttgaaaaataaagcgtttgcatt	120
Patient 5	cattataactaaatcaatcagggcaattagtagtaccagaatttgaaaaataaagcgtttgcatt	120
CP014865_ <i>R. prowazekii</i>	tattataactaaatcaaccagggcagtttagtagtaccagaatttgaaacagaagcgtttgcatt	120
CP003398_ <i>R. typhi</i>	aaaagtaaatgaagtgtcaactccagtcacaaacagatttcgggtggcatattataaaagt	180
CP003397_ <i>R. typhi</i>	aaaagtaaatgaagtgtcaactccagtcacaaacagatttcgggtggcatattataaaagt	180
AE017197_ <i>R. typhi</i>	aaaagtaaatgaagtgtcaactccagtcacaaacagatttcgggtggcatattataaaagt	180
Patient 3	aaaagtaaatgaagtgtcaactccagtcacaaacagatttcgggtggcatattataaaagt	180
Patient 5	aaaagtaaatgaagtgtcaactccagtcacaaacagatttcgggtggcatattataaaagt	180
CP014865_ <i>R. prowazekii</i>	aaaagtaaatgaagtttcaactccagtcacaaacaagtttcgggtggcatattataaaagt	180
CP003398_ <i>R. typhi</i>	gcttgagaaaaaacctgtacc	201
CP003397_ <i>R. typhi</i>	gcttgagaaaaaacctgtacc	201
AE017197_ <i>R. typhi</i>	gcttgagaaaaaacctgtacc	201
Patient 3	gcttgagaaaaaacctgtacc	201
Patient 5	gcttgagaaaaaacctgtacc	201
CP014865_ <i>R. prowazekii</i>	gcttgagaaaaaacctgtgcc	201

Technical Appendix Figure. CLUSTAL O (1.2.4) multiple sequence alignment of partial *prsA* gene from *Rickettsia typhi* and *R. prowazekii* reference strains and bacteria from 2 patients hospitalized with typhus during World War II, Hamburg, Germany, 1940–1944. GenBank accession nos. of reference strains are

provided in alignment. The nucleotides that differ between the *R. prowazekii* sequence and *R. typhi* sequences are highlighted. Sequences of bacteria from patients 3 and 5 are identical to *R. typhi* rickettsia.

References

1. Papp S, Rauch J, Kuehl S, Richardt U, Keller C, Osterloh A. Comparative evaluation of two Rickettsia typhi-specific quantitative real-time PCRs for research and diagnostic purposes. *Med Microbiol Immunol (Berl)*. 2017;206:41–51. [PubMed http://dx.doi.org/10.1007/s00430-016-0480-z](http://dx.doi.org/10.1007/s00430-016-0480-z)
2. Rauch J, Eisermann P, Noack B, Mehlhoop U, Muntau B, Schäfer J, et al. Typhus Group Rickettsiosis, Germany, 2010-2017. *Emerg Infect Dis*. 2018;24:1213–20. [PubMed http://dx.doi.org/10.3201/eid2407.180093](http://dx.doi.org/10.3201/eid2407.180093)