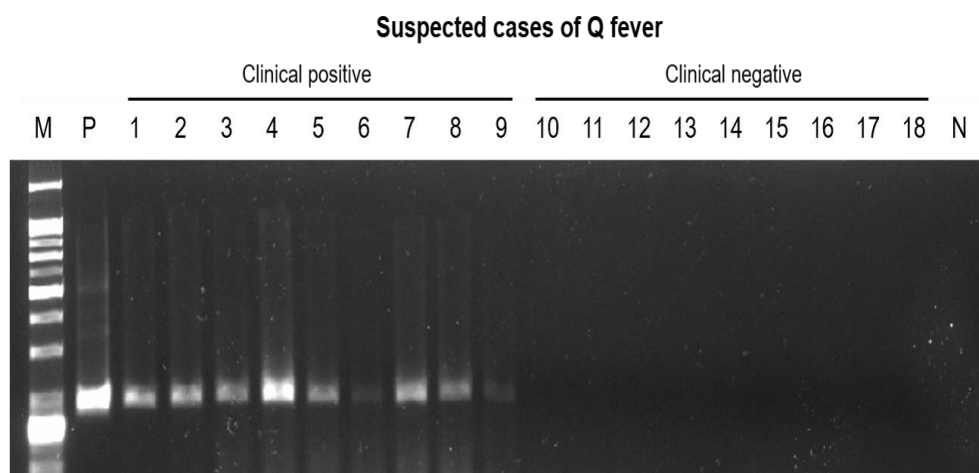


Supplementary

Rapid Molecular Diagnostic Sensor Based on Ball-Lensed Optical Fibers

Byungjun Park ^{1,2,†}, Bonhan Koo ^{3,4,†}, Jisub Kim ¹, Kiri Lee ¹, Hyeonjin Bang ¹, Sung-Han Kim ⁴, Kyung Young Jhang ^{2,*}, Yong Shin ^{5,*} and Seungrag Lee ^{1,*}

- ¹ Medical Device Development Center, Osong Medical Innovation Foundation, 123 Osongsaengmyung-ro, Heungdeok-gu, 28160 Cheongju-si, Korea; yachon@kbiohealth.kr (B.P.); jiseob@intekmedi.co.kr (J.K.); krlee@kbiohealth.kr (K.L.); crisenc@kbiohealth.kr (H.B.)
- ² School of Mechanical Engineering, Hanyang University, 222 Wangsimni-ro, Seongdong-gu, , Korea
- ³ Department of Convergence Medicine, Asan Medical Institute of Convergence Science and Technology, Asan Medical Center, University of Ulsan College of Medicine, 88 Olympic-ro-43gil, Songpa-gu, Korea; qhsgksdl@ulsan.ac.kr
- ⁴ Department of Infectious Diseases, Asan Medical Center, University of Ulsan College of Medicine, 88 Olympic-ro-43gil, Songpa-gu, Korea; shkimmd@amc.seoul.kr
- ⁵ Department of Biotechnology, College of Life Science and Biotechnology, Yonsei University, 50 Yonsei Ro, Seodaemun Gu, 03722, Korea
- * Correspondence: kyjhang@hanyang.ac.kr (K.Y.J.); shinyongno1@yonsei.ac.kr (Y.S.); naviman78@kbiohealth.kr (S.L.)
- † These authors contributed equally to the work.



* IS1111a; *C. burnetii* transposase (IS1111a) gene, complete cds (NCBI Nr. M8806)

Figure S1. Gel electrophoresis results for the detection of *Coxiella burnetii* DNA in clinical specimens from patients with Q fever, using end-point PCR. (M: DNA marker; P: Positive template; 1–9: Q-fever-positive clinical specimens; 10–18: Q-fever-negative clinical specimens; N: Negative control).

Table S1. Primer sequences used for the amplification of *Coxiella burnetii* DNA.

<i>C.burnetii</i>	Primer		Sequence (5′ – 3′)
IS1111a	Conventional assay	Forward	GAGCGAACCATTGGTATCG
		Reverse	CTTTAACAGCGCTTGAACGT
	BLOF bio-optical sensor	Forward	NH ₂ -(CH ₂) ₁₂ -GAGCGAACCATTGGTATCGGACGTTTATGGGGATG
		Reverse	GTATCTTTAACAGCGCTTGAACGTCTTGTG

IS1111a; *C. burnetii* transposase (IS1111a) gene, complete cds (NCBI Nr. M8806)

Table S2. Simulation conditions of the ball-lensed optical fiber (BLOF) with Zemax software.

	Items	Specifications
Coreless fiber (CLF)	Coreless fiber length	285 μm
	Ball diameter	300 μm
	Cladding diameter	125 μm
Polarization fiber (PM)	Core diameter	8.5 μm
	Cladding diameter	125 μm
	Mode field diameter	10 μm (@1550 nm)
	Numerical aperture	0.125
Optical Source	Wavelength	1550 nm