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3D-Printed Modular Microfluidic Device Enabling Preconcentrating Bacteria and Purifying Bacterial DNA in Blood for Improving the Sensitivity of Molecular Diagnostics

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Table S1. Concentration and purity of bacterial gDNA obtained by commercial DNA purification kits (MagListo™ 5M Genomic DNA extraction kit, Bioneer Co. Daejeon, Korea; MagJET Genomic DNA kit, Thermo Fischer Scientific, Waltham, MA, USA; HiGene™ Genomic DNA Prep Kit, Biofact, Daejeon, Korea) at different concentrations of *E. coli* O157:H7 in 200 µL of blood. The purity and yield of the extracted gDNA were determined based on the ratio of absorbance at wavelengths of 230, 260 and 280 nm, using a spectrophotometer (Nano-200, AllSheng, Hangzhou, China).

Commercial DNA Extraction Kit	Bacteria Concentration (CFU/mL)	gDNA Concentration (ng/µL)	Purity	
			260/280	260/230
MagListo™ 5M Genomic DNA extraction kit	10	12.68	1.71	1.99
	100	15.02	1.70	2.15
	1000	16.76	1.67	2.04
MagJET Genomic DNA kit	10	139.89	0.77	0.81
	100	203.02	0.98	0.87
	1000	189.12	1.49	2.60
HiGene™ Genomic DNA Prep Kit	10	100.32	1.11	1.25
	100	98.99	1.08	1.27
	1000	112.91	1.20	1.37

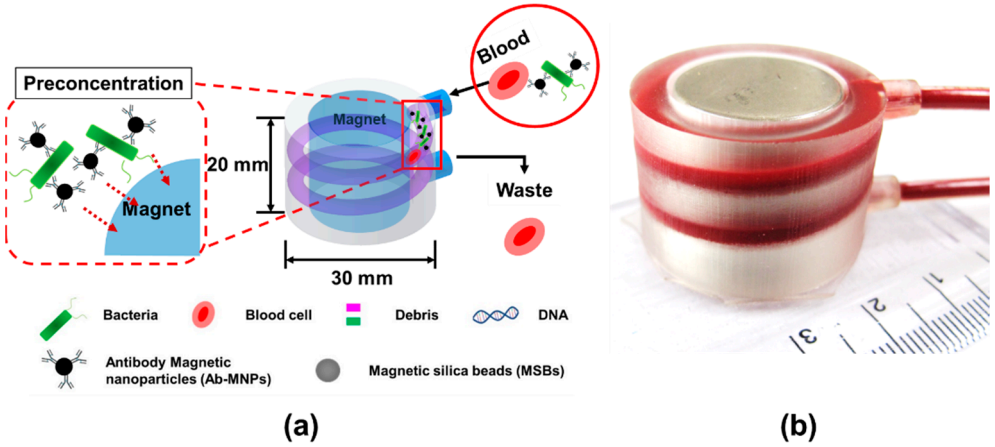

Figure S1. The helical microchannel for magnetic preconcentration of bacteria of interest. (**a**) A schematic with dimension of the helical microchannel. (**b**) Its photographic image.

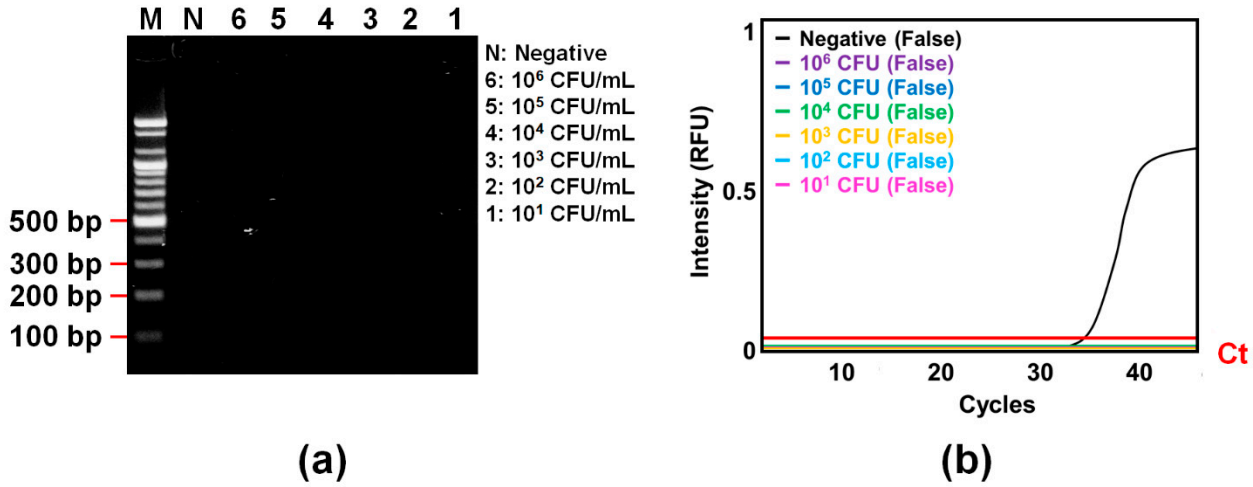

Figure S2. Amplification of a target gene (*eae*) in *E. coli* O157:H7 in blood by PCR and quantitative PCR (qPCR) without any DNA purification process. (**a**) PCR with gel electrophoresis and (**b**) qPCR of *eae* gene in *E. coli* O157:H7 at different concentrations (10–10^6 CFU/mL) from 2 µL of blood. Ct: cycle threshold. The primer used in this study was based on the coding sequence of the intimin adherence protein in the *eae* gene of *E. coli* O157:H7 with an amplicon size of 150 base pairs, the nucleotide sequence was (GGCGGATTAGACTTCGGCTA) for the forward primer and (CGTTTTGGCACTATTTGCCC) for the reverse primer. PCR reagents were used for conventional PCR, and the temperature was maintained using the MJ MINI thermocycler (Bio-RAD, Hercules, CA,). PCR products were separated based on size for 40 min at 100 V using a 2% agarose gel. Light Cycler Nano (Roche, Basel, Switzerland) was used for qPCR, and Ct was automatically determined. The same primers were used for both PCR and qPCR. Ct: cycle of threshold.

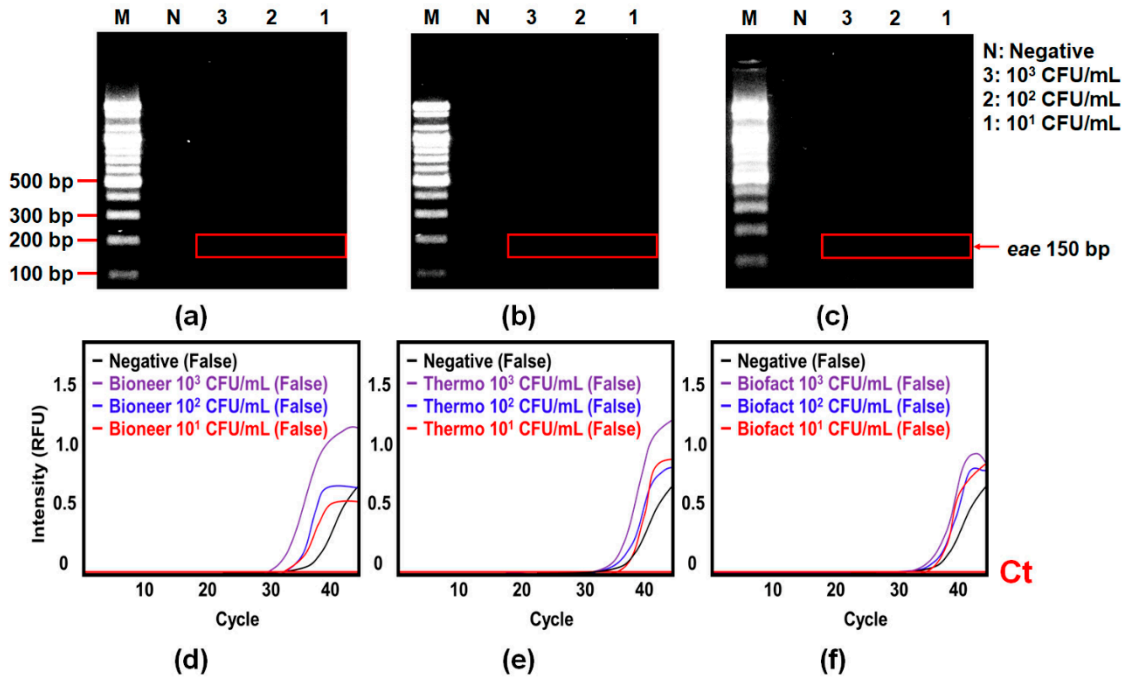

Figure S3. Amplification of the target gene in *E. coli* O157:H7 in blood with the use of commercial DNA purification kits (MagListo™ 5M Genomic DNA extraction kit, Bioneer Co. Daejeon, Korea; MagJET Genomic DNA kit, Thermo Fisher Scientific, Waltham, MA; HiGene™ Genomic DNA Prep Kit [Magnetic Bead] for cultured cell, Biofact, Daejeon, Korea) by PCR and qPCR. (**a**–**c**) PCR with gel electrophoresis and (**d**–**f**) qPCR of *eae* gene in *E. coli* O157:H7 at different concentrations (10–10^3 CFU/mL) from 200 μL of blood purified by either Bioneer DNA extraction kits or Thermo Fischer Scientific DNA extraction kits (b,e) or Biofact DNA extraction kit (d–f).