Supporting Information

Genomic DNA extraction from cells by electroporation on an integrated microfluidic platform

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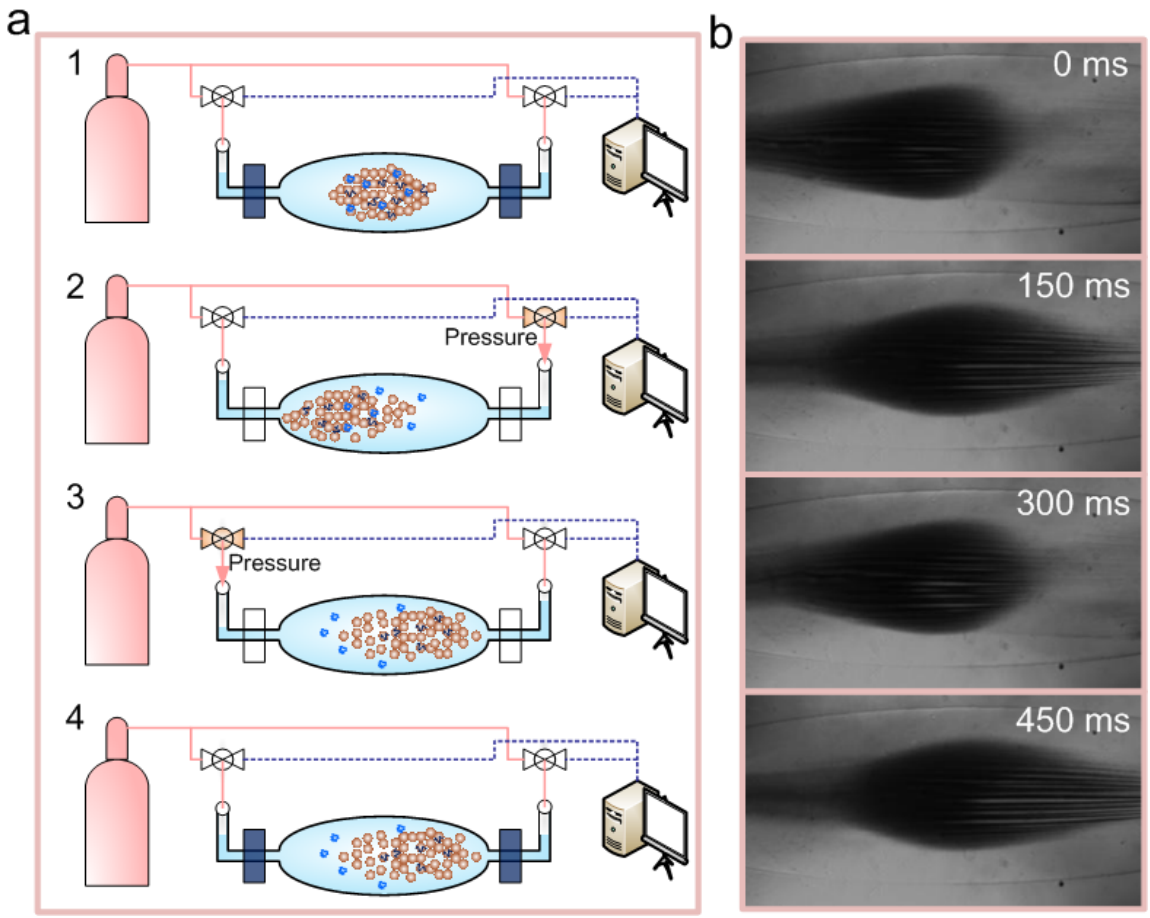

Figure S1. Washing of beads by pressure-driven oscillatory flow. Both inlets of the chamber are connected to the pressure source via off-chip solenoid valves. The application/removal of the pressure is automatically controlled by switching the solenoid valves through a LabView program. (a) The workflow diagram: (1) The two on-chip pneumatic microvalves at the two ends of the elliptical chamber are closed at the beginning; (2) The two pneumatic valves are open and the pressure is applied at the right end (by switching open the right solenoid valve) to push the beads to the left; (3) The pressure is applied at the left end (by switching open the left solenoid valve) to push the beads to the right; (4) After repeating (2) and (3) for enough times, the pressure application is stopped and the two microvalves are closed to avoid sample loss. (b) Time-lapse image series of the beads undergoing oscillatory movement in the elliptical chamber.

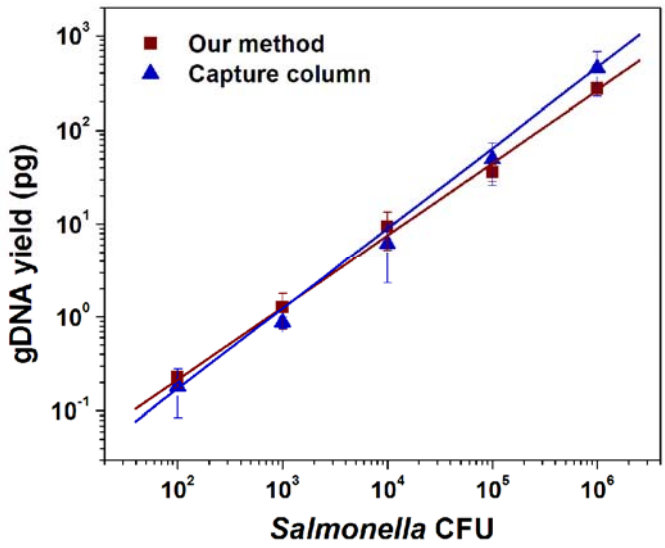

Figure S2. Comparison of two DNA extraction methods. DNA was extracted from *Salmonella* with varying initial CFU (10^2 to 10^6) using (1) Our on-chip method and (2) Off-chip Qiagen Generation Capture column kit. For on-chip electrical lysis experiments, 10 square DC electrical pulses (0.1 s duration for each pulse with 9.9 s in between) with a field intensity of 1.8 kV/cm were applied. *Salmonella* specific *invA* gene was targeted, and gDNA yield was quantified by real-time PCR.

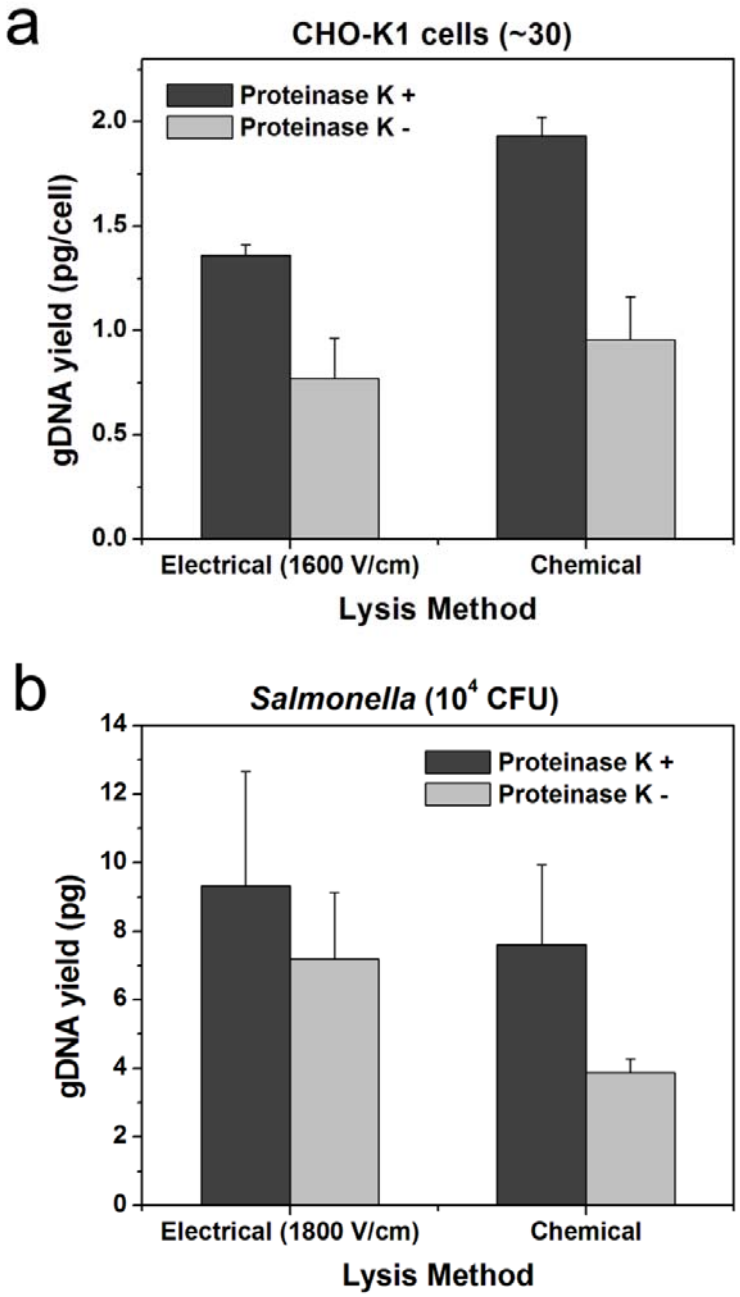

Figure S3. The influence of proteinase K on DNA extraction and detection. gDNA was extracted by electroporation or chemical lysis with (black bars) or without (grey bars) proteinase K. (a) ~30 CHO-K1 cells were electrically lysed at a field intensity of 1.6 kV/cm or chemically lysed by Qiagen lysis buffer. Housekeeping *GAPDH* gene was analyzed. (b) 10^4 CFU of *Salmonella* were electrically lysed at a field intensity of 1.8 kV/cm or chemically lysed by ChargeSwitch lysis buffer. *Salmonella* specific *invA* gene was analyzed. For all electrical lysis experiments, 10 square DC electrical pulses (0.1 s duration for each pulse with 9.9 s in between) were applied. gDNA yield was quantified by real-time PCR.