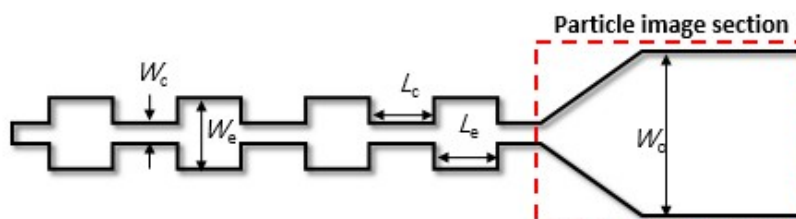


## Supplementary information

(a)

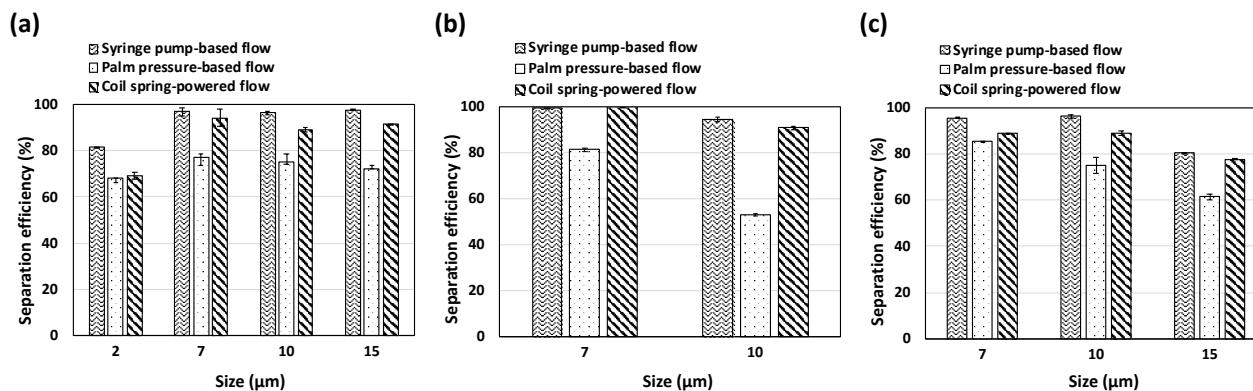
Particle diameter ( $\mu\text{m}$ )	Particle size uniformity (%)	Volume fraction (%)	Particle concentration ( $\times 10^6/\text{mL}$ )
2	5	0.005	114
7	14	0.2	10.7
10	14	0.2	3.64
15	18	0.2	1.08

(b)



	Height ( $\mu\text{m}$ )	$W_c$ ( $\mu\text{m}$ )	$W_e$ ( $\mu\text{m}$ )	$L_c$ ( $\mu\text{m}$ )	$L_e$ ( $\mu\text{m}$ )	$W_o$ ( $\mu\text{m}$ )	Orifice (n)
Plasma-chip	60	150	750	375	750	800	50
CTC-chip	60	60	300	150	300	800	80
WBC-chip	30	30	150	75	150	800	100

S1. Specifications of (a) particle suspensions and (b) channel dimensions of microfluidic chips.



S2. Separation efficiencies of microbeads in (a) plasma-chip, (b) WBC-chip, and (c) CTC-chip. Data are represented using average  $\pm$  standard deviation ( $n = 3$ ).