

## Supporting Information

### **Macrophage-red blood cell hybrid membranes coated ultrasound-responsive microbowl to eliminate pathogens, endotoxins, and heavy metal ions for blood purification**

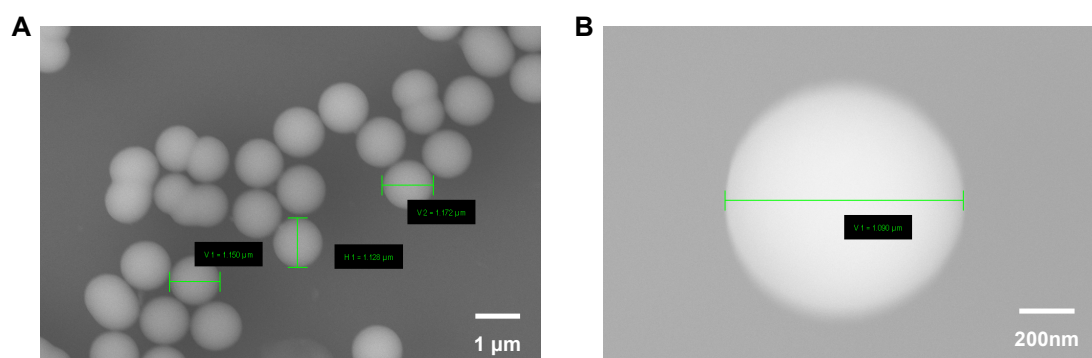
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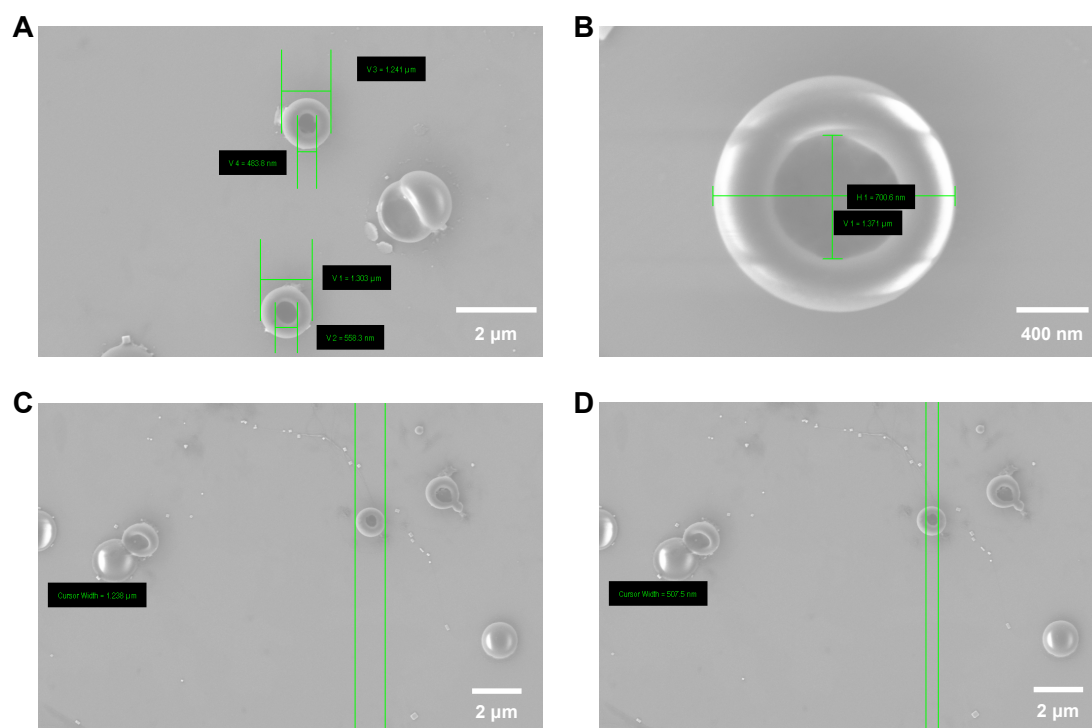
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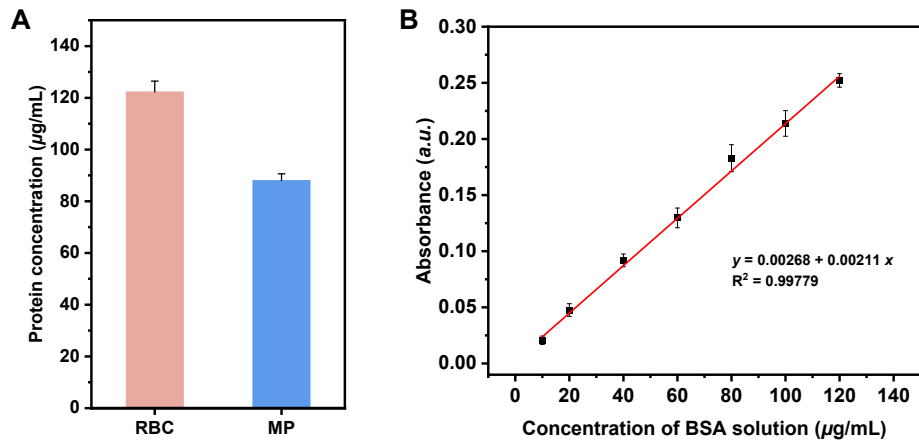
\* Corresponding author.



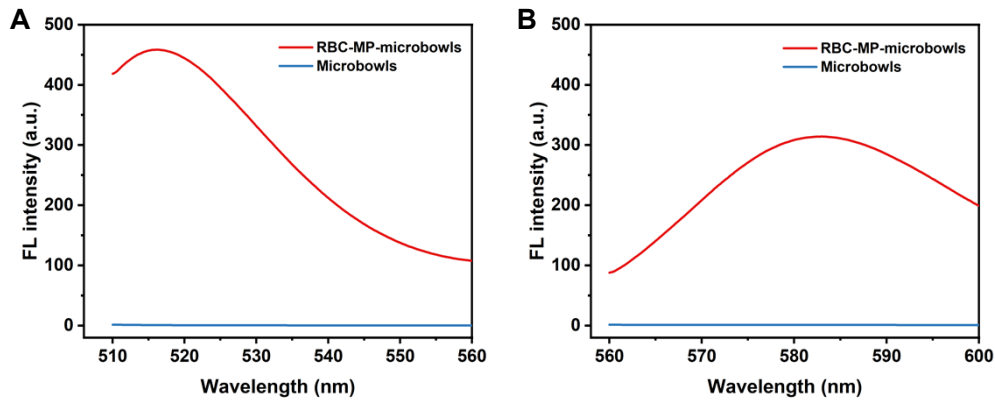
**Fig. S1.** The SEM images of PGMA microspheres.



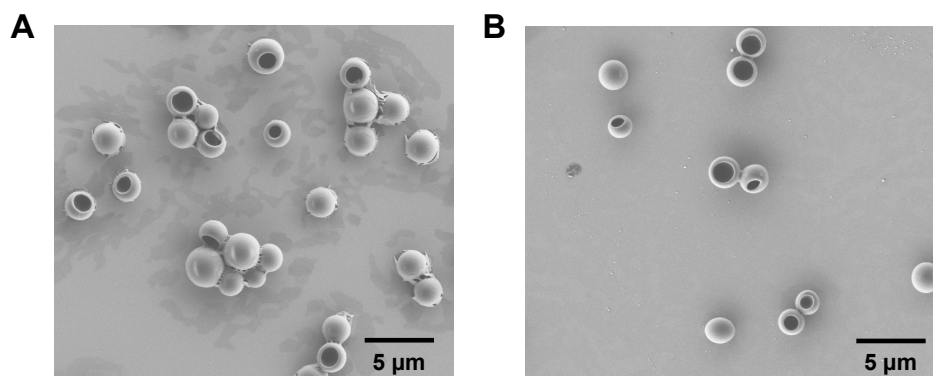
**Fig. S2.** The SEM images of microbowls. The outer and inner diameters of microbowls were measured.



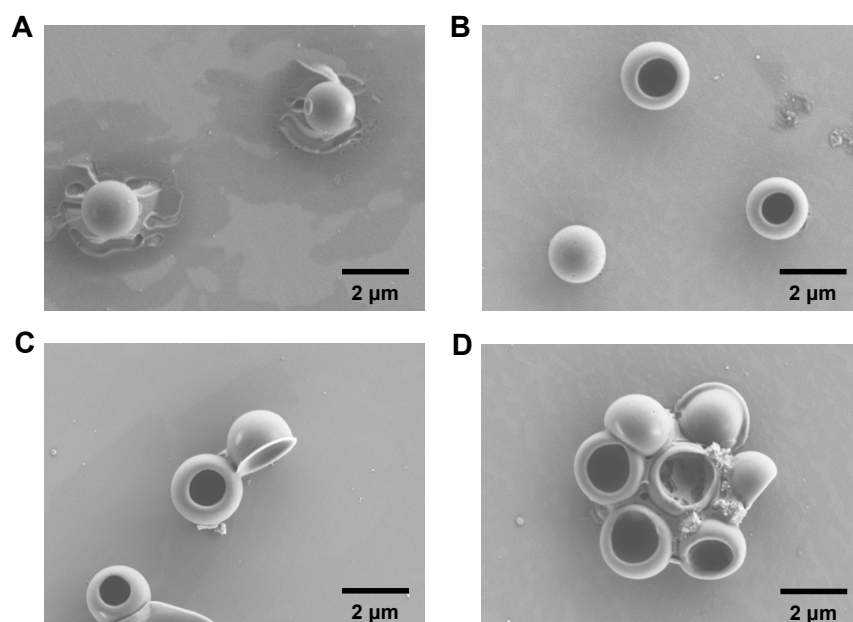
**Fig. S3.** (A) The membrane protein contents measured by Bradford protein assay, (B) The standard curve of protein concentration with Bovine Serum Albumin.



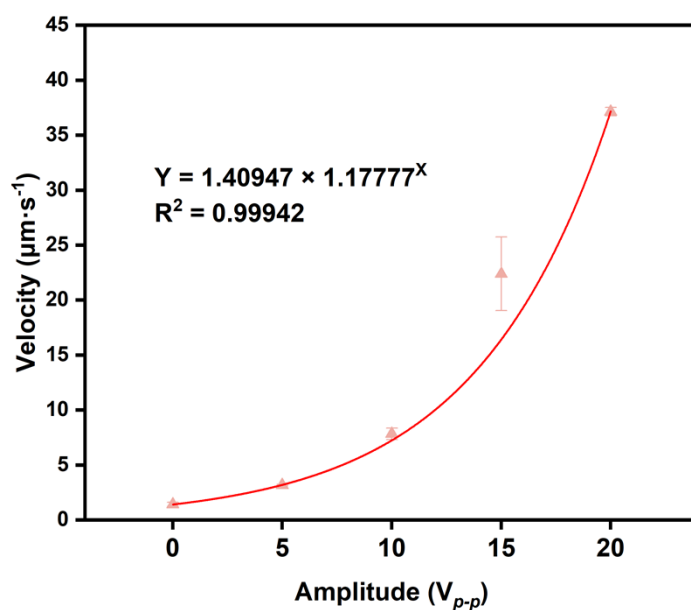
**Fig. S4.** The fluorescence emission spectra of RBC-MP-microbowls coated with (A) FITC-labeled macrophage membranes or (B) Rhodamine B-labeled RBC membranes, and microbowls with probe-free cell membranes coating as control group.



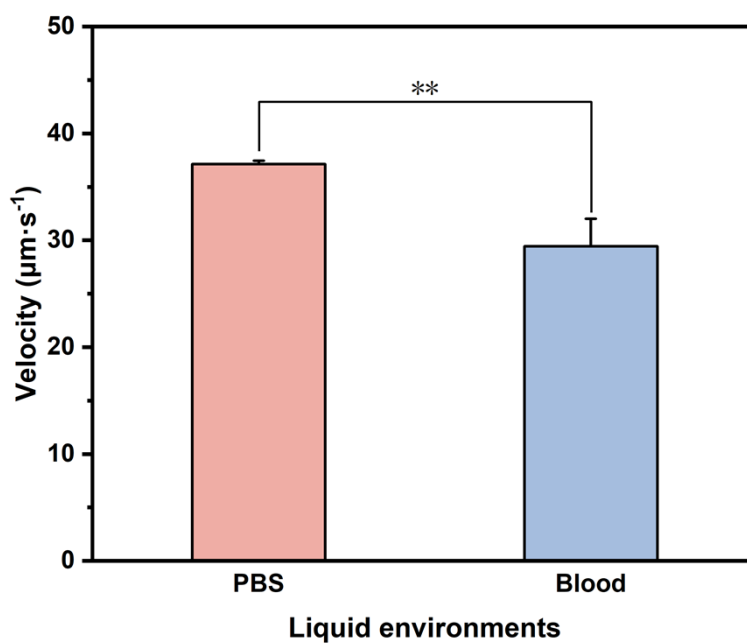
**Fig. S5.** The SEM images of microbowls prepared with different DS ratio at (A) 5.0 mg/5.0 mg and (B) 10.0 mg/5.0 mg.



**Fig. S6.** The SEM images of microbowls after (A) 3 h, (B) 12 h, (C) 24 h and (D) 36 h of eroding.

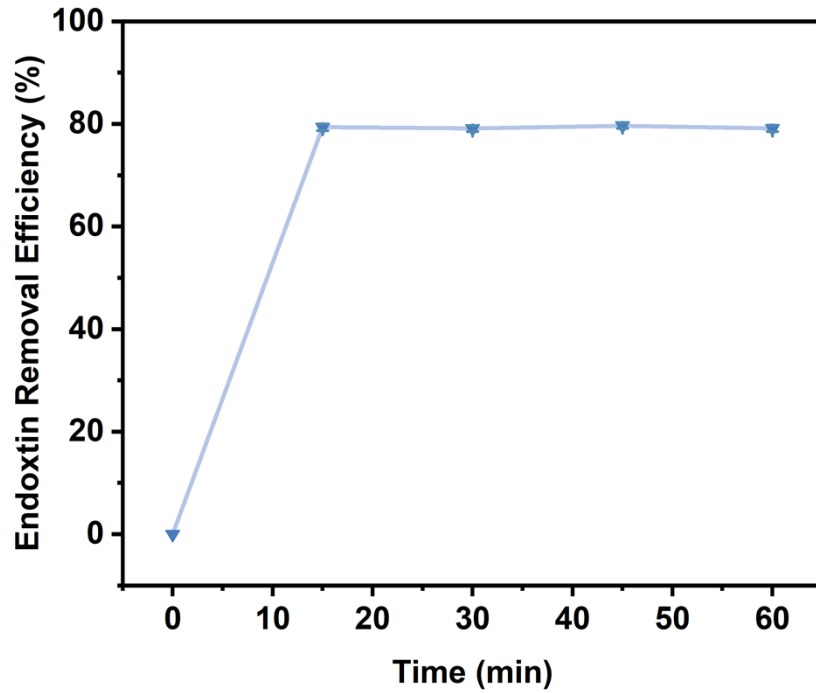


**Fig. S7** The average velocities of RBC-MP-microbowls over 5 seconds at different ultrasonic amplitudes.

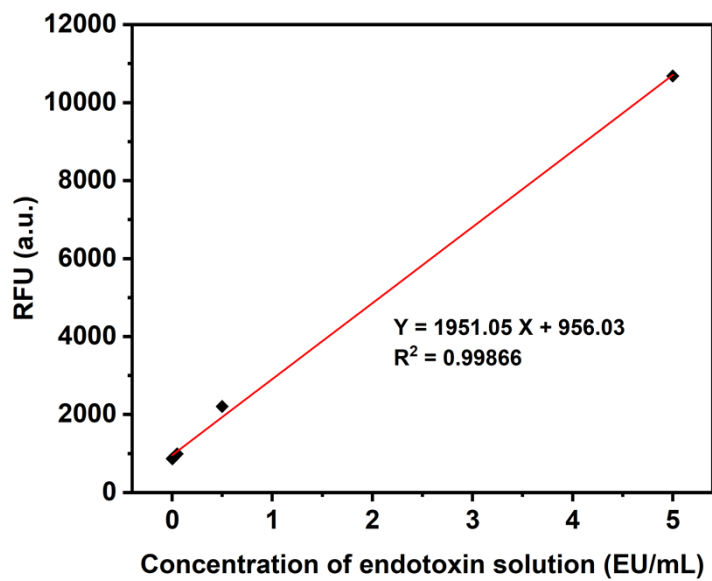


**Fig. S8** Mean square displacement (MSD) at different ultrasound amplitudes versus time interval analyzed from tracking trajectories The moving velocity of RBC-MP-

microbowls in different liquid environments. The statistical significance was analysed using the student's t-test. \*:  $P < 0.05$ ; \*\*:  $P < 0.01$ ; \*\*\*:  $P < 0.001$ .



**Fig. S9** The removal efficiency of endotoxin after incubating with the RBC-MP-microbowls for different times



**Fig. S10.** The standard curve of endotoxin ranging from 0.005 EU/mL to 5 EU/mL