*Supporting Information*

# One-Pot Quaternization of Dual-Responsive Poly(vinyl alcohol) with AIEgens for pH-Switchable Imaging and Killing of Bacteria

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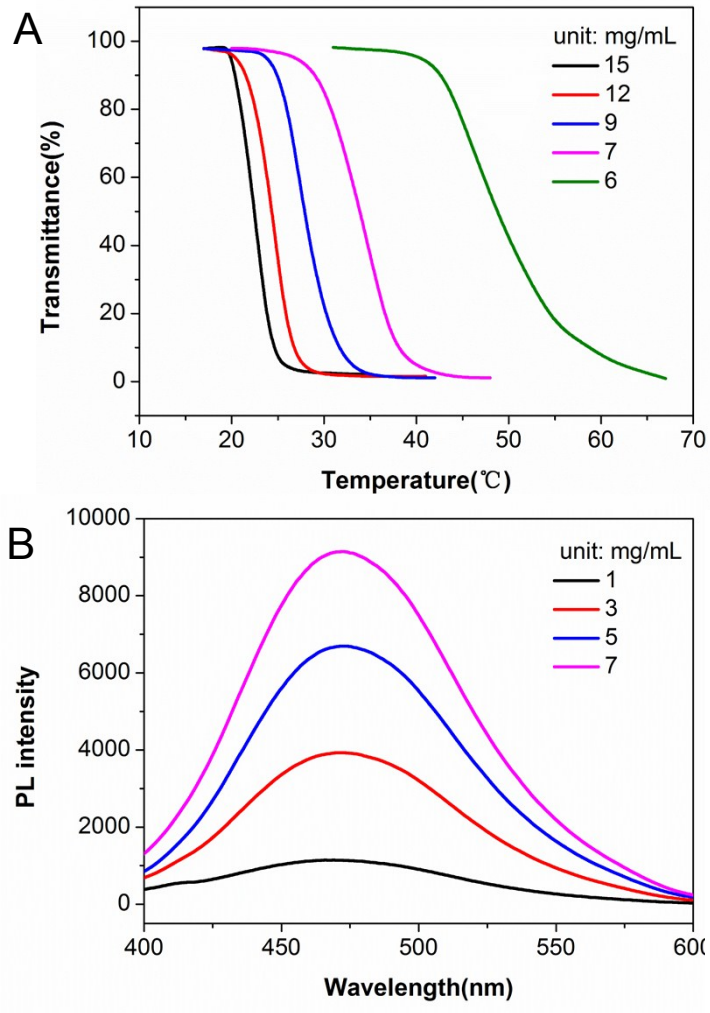



**Figure S1**. Transmittance variation of aqueous solutions at various concentration (A) of PVA-TPE as a function of temperature observed at 600 nm and pH 7.4. PL intensity (B) of PVA-TPE in different concentrations at pH 7.4.

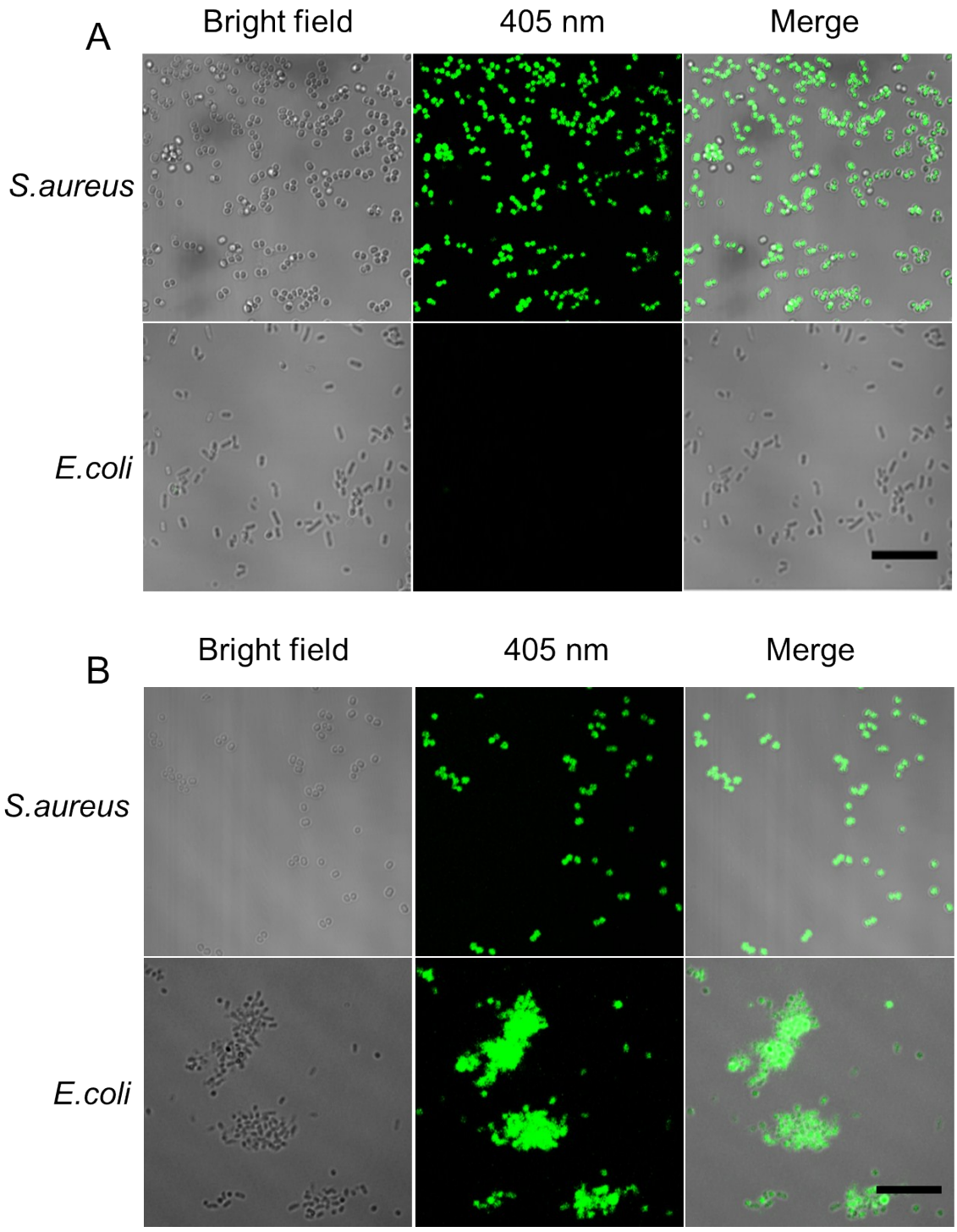



**Figure S2.** The CLSM images of *S. aureus* and *E. coli* bacteria after incubation with PVA-TPE at pH 7.4 (A) and pH 5.5 (B) for 2 h. For PVA-TPE, $\lambda_{ex}$ = 405 nm, $\lambda_{em}$ = 450-550 nm. (Colour version of this figure can be viewed online).

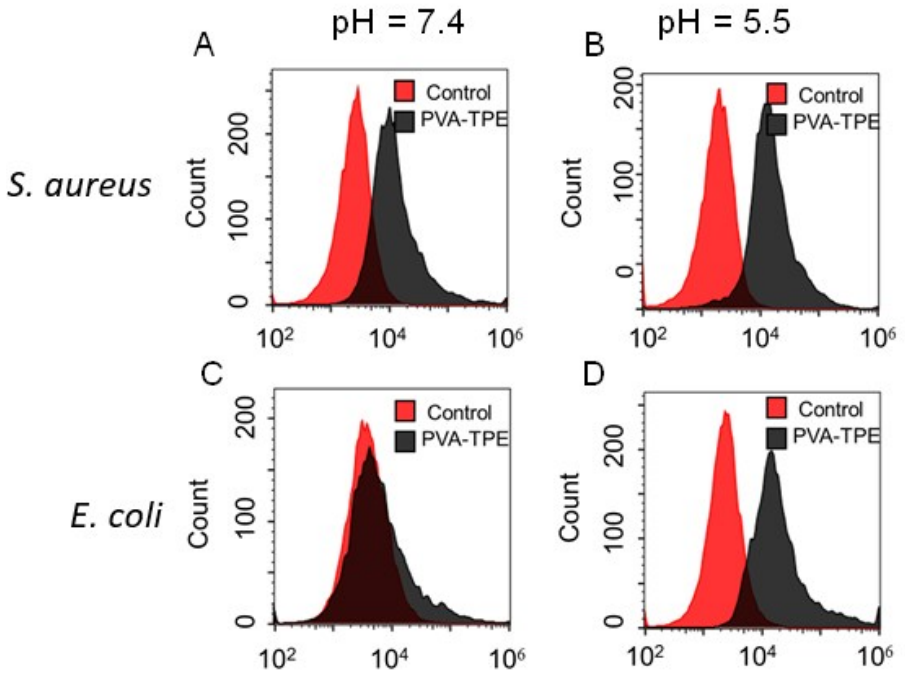



**Figure S3.** Fluorescence intensity of intracellular *S. aureus* (A, B) *and E. coli* (C, D) treated by PVA-TPE at pH 7.4 (A, C) and pH 5.5 (B, D) and quantified by flow cytometry.

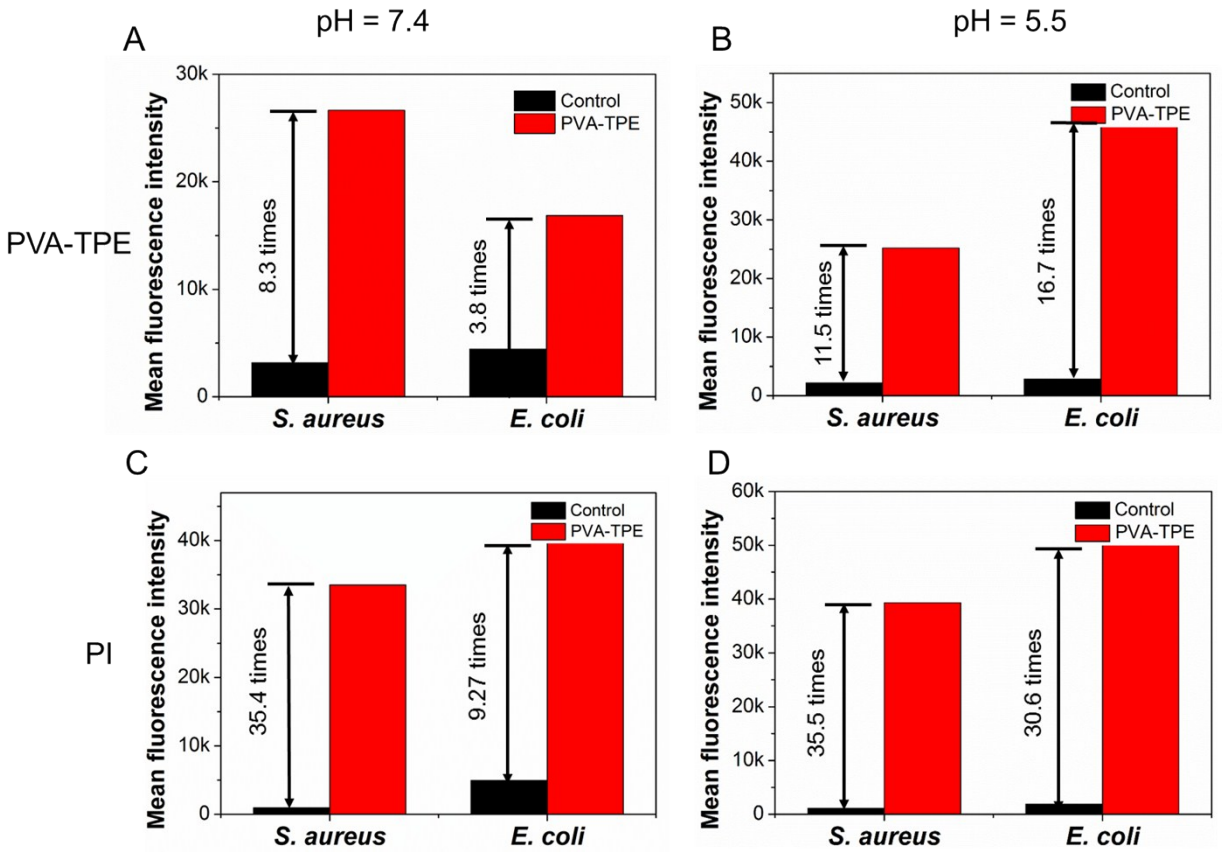



**Figure S4.** The mean fluorescence intensities of *S. aureus* and *E. coli* incubated with PVA-TPE (A, B) and PI (C, D) at pH 7.4 and pH 5.5.

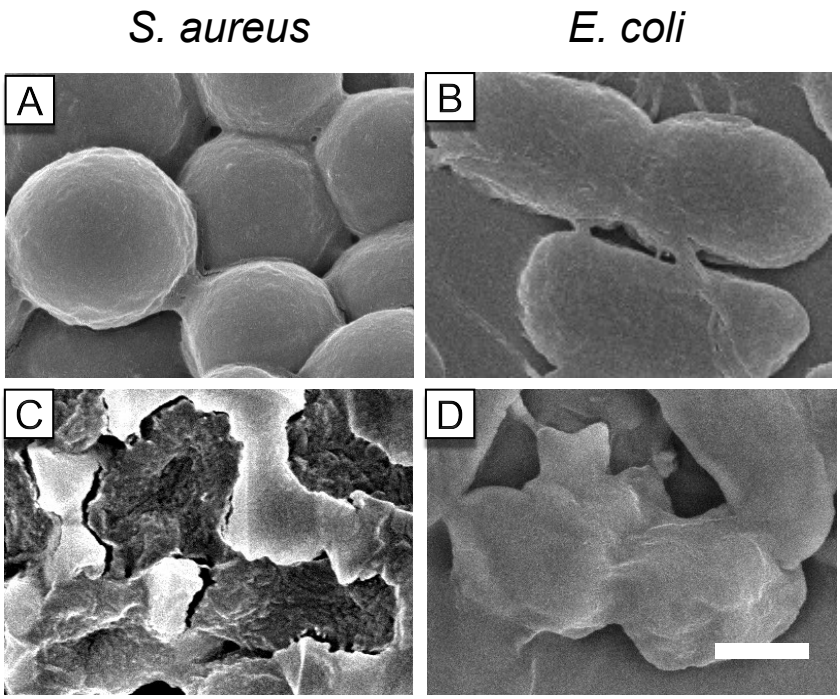
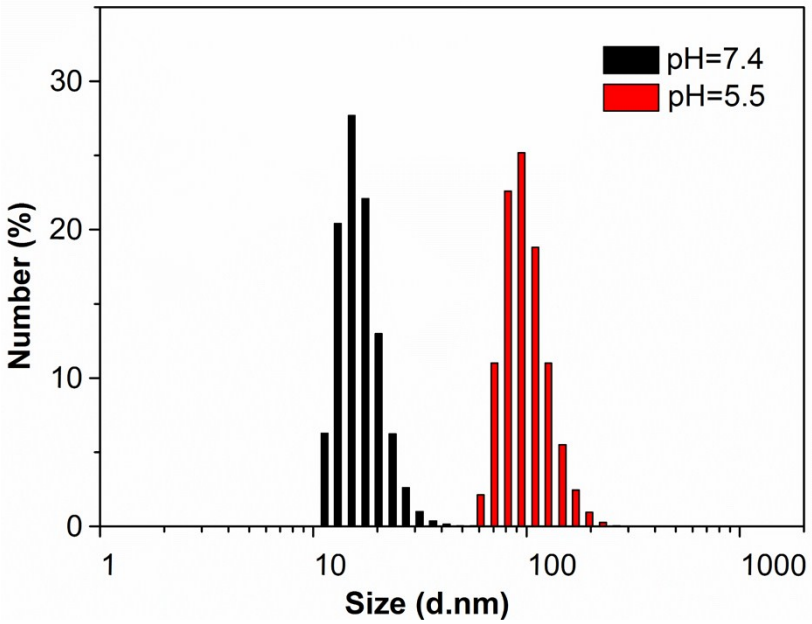



**Figure S5.** SEM images of *S. aureus* and *E. coli* suspension (A, B) before and (C, D) after the treatment of 25 μg/mL PVA-TPE for 2 h at pH 5.5. Scale bar = 500 nm.



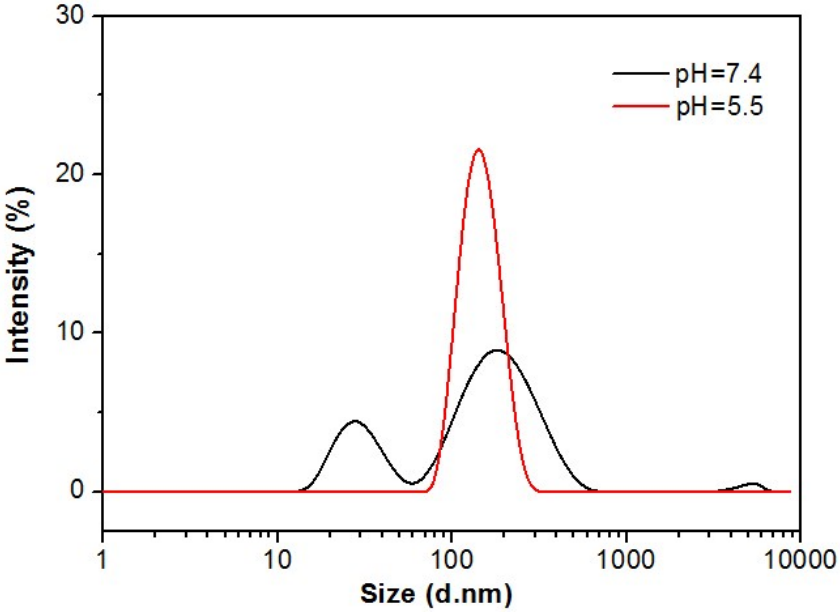



**Figure S6.** Size and size distributions of aggregates formed by PVA-TPE in buffers of pH 7.4 and pH 5.5.

**Table S1** Diameters, zeta potentials and polydispersities of PVA-TPE.

| pH Values | Diameter (nm) | Polydispersity | Zeta potential (mV) |
|---|---|---|---|
| 5.5 | 153.6±2.80 | 0.24±0.005 | 6.00±0.56 |
| 7.4 | 90.0±1.28 | 0.52±0.003 | 0.46±0.46 |

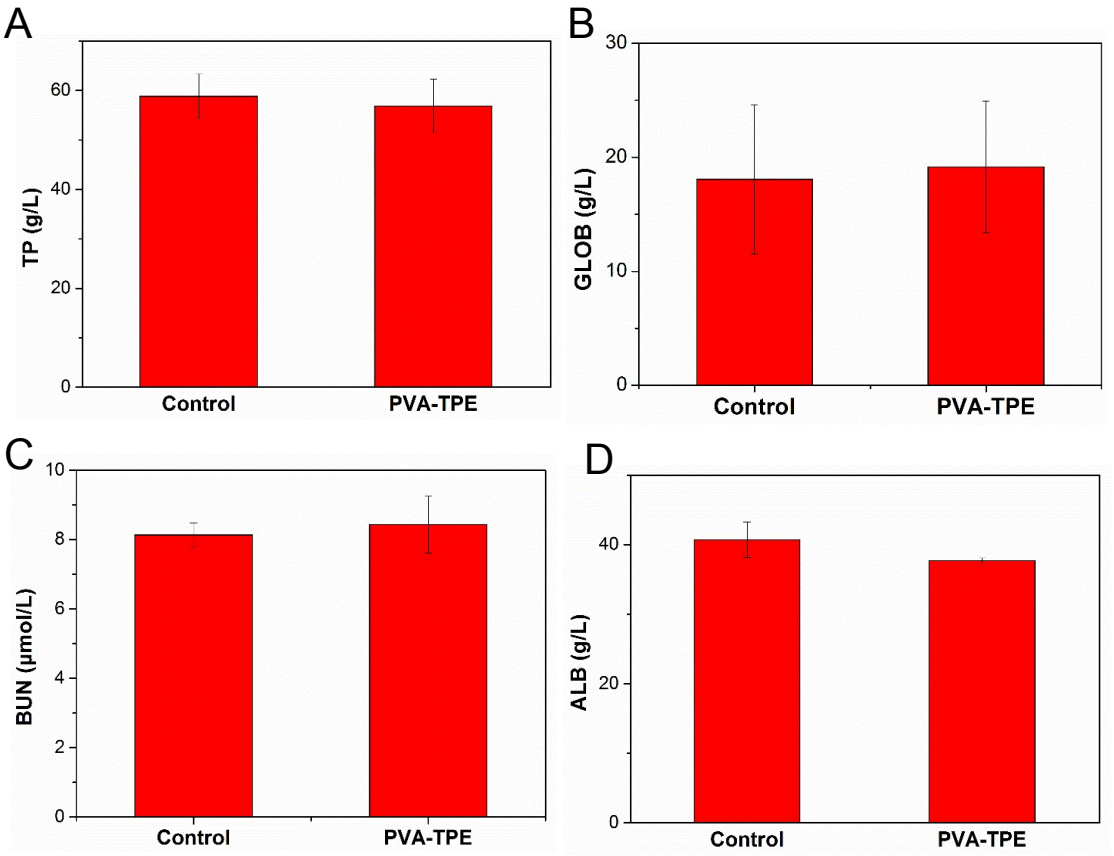



**Figure S7.** Blood biochemistry results of the PVA-TPE treated mice at day14. These results show mean and standard deviation of total protein (TP), globulin (GLOB), blood urea nitrogen (BUN), and albumin (ALB). Bars represent mean standard deviation. Values represent means ±SE, *n* =3