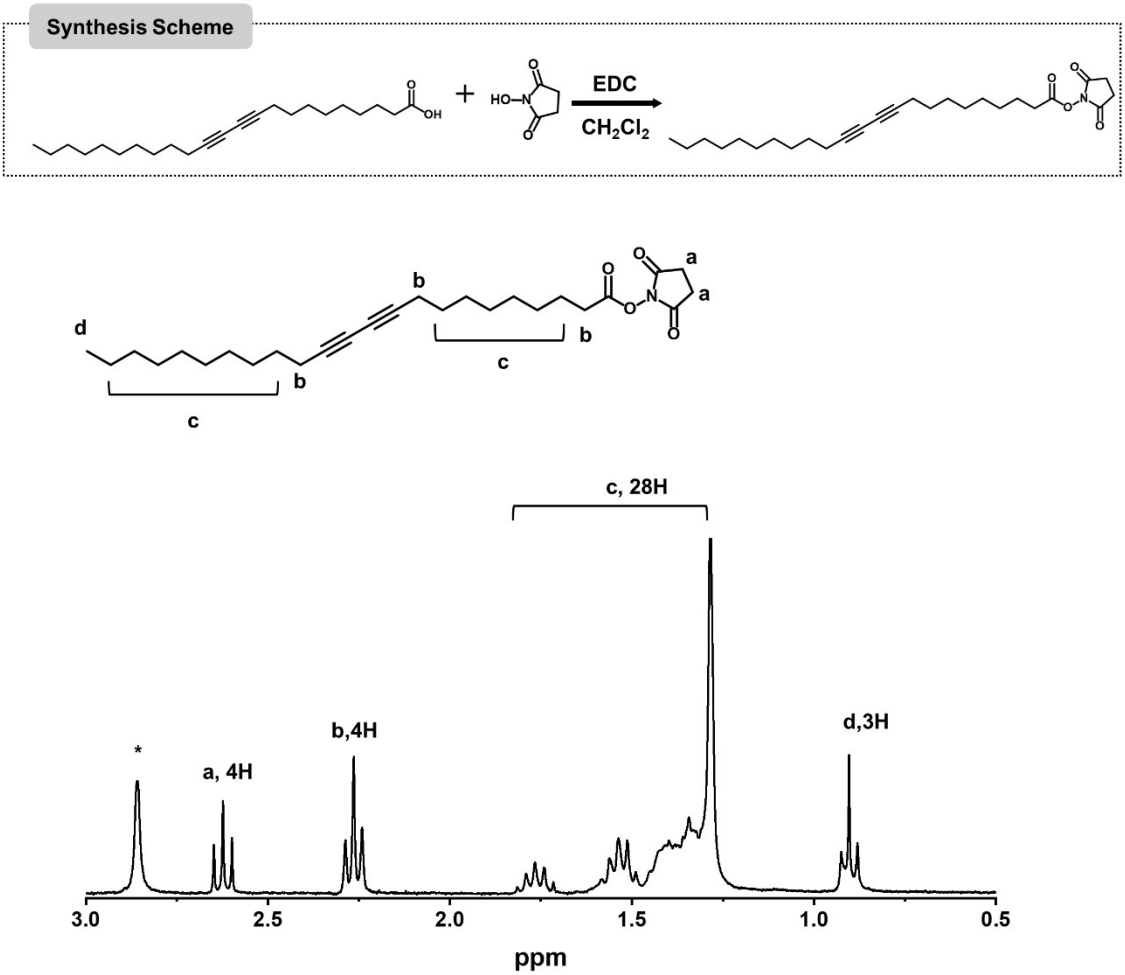
Electronic Supplementary Material (ESI) for Materials Advances.

Supplementary material



* : ^{1}H peak from N-hydroxysuccinimide

Fig. S1. Synthesis scheme of TCDA-NHS and corresponding ^{1}H NMR analysis results

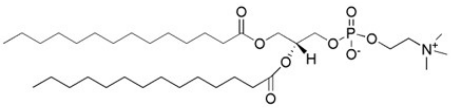
Composition (mole ratio)	CR (%) 70°C@20min	Photo	note
PCDA:PCDA-NHS:DMPC (0.9:0.1:0.6)	20.1%		No aptamer
TCDA:TCDA-NHS:DMPC (0.9:0.1:0.6)	37.9%		
TCDA:TCDA-NHS:DMPC (0.9:0.1:0.3)	25.2%		
TCDA:TCDA-NHS:DMPE (0.9:0.1:0.6)	28.0%		

PCDA

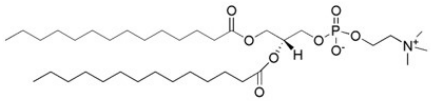
TCDA

PCDA-NHS

TCDA-NHS



DMPE



DMPC

Table S1. Heat Stimulated colorimetric response of different liposome composition and chemical structure of each components.

Liposomes of different compositions were prepared by the bath method to the same final concentration of 1 mM, and UV polymerization was performed without aptamer attachment. The sensitivity of each liposomal material was evaluated through a thermal colorimetric response after a 20-minute incubation at 70 °C. The extent of color alteration was quantified as CR (%), and the specific calculation method is explained in the manuscript.

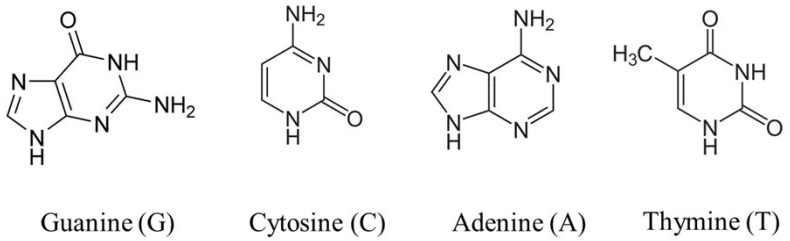
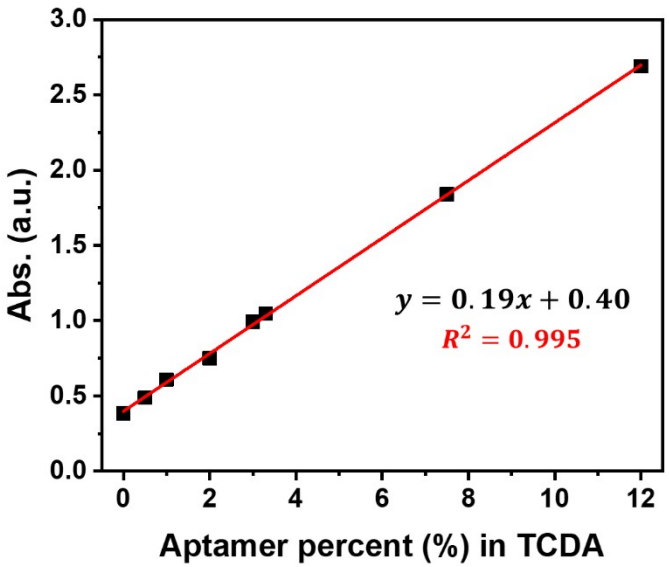
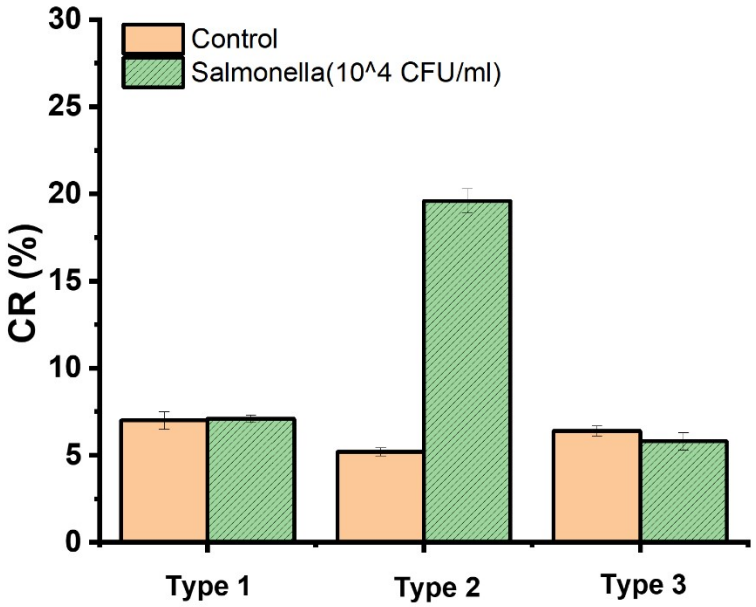


Fig. S2. Chemical structure of Guanine, Cytosine, Adenine, and Thymine



Abs. (260 nm)	Aptamer feeding concentration (%)			
	1	3	7.5	12
(a) Aptamer conc. In TCDA liposome solution	0.6084	0.9810	1.8399	2.690
(b) After dialysis TCDA liposome solution	0.4830	0.7722	1.5195	2.155
TCDA liposome conjugated aptamer %	79.4	78.8	82.6	80.1

Fig. S3. To generate a master curve, aptamer conjugation onto TCDA liposomes is performed across different concentrations (1%, 3%, 7.5%, and 12%). Using 100-500 Dalton dialysis membrane tubing, the mixture is subjected to water exchange and stirring over 3 days, ensuring that only TCDA liposomes remain. After verifying the absorbance of the obtained solution through UV-vis spectroscopy, aptamer efficiency is determined by comparing it with the absorbance of the TCDA liposome-aptamer solution.



Sensor	Aptamer	Salmonella (CFU/mL)	CR (%)
Type 1	No aptamer	0	7.0
		10^4	7.1
Type 2	*Salmonella* Specific aptamer	0	5.2
		10^4	19.6
Type 3	Non-specific aptamer	0	6.4
		10^4	5.8

Fig. S4. *Salmonella* -specific sensing properties of PDA liposome sensors depending on aptamer type

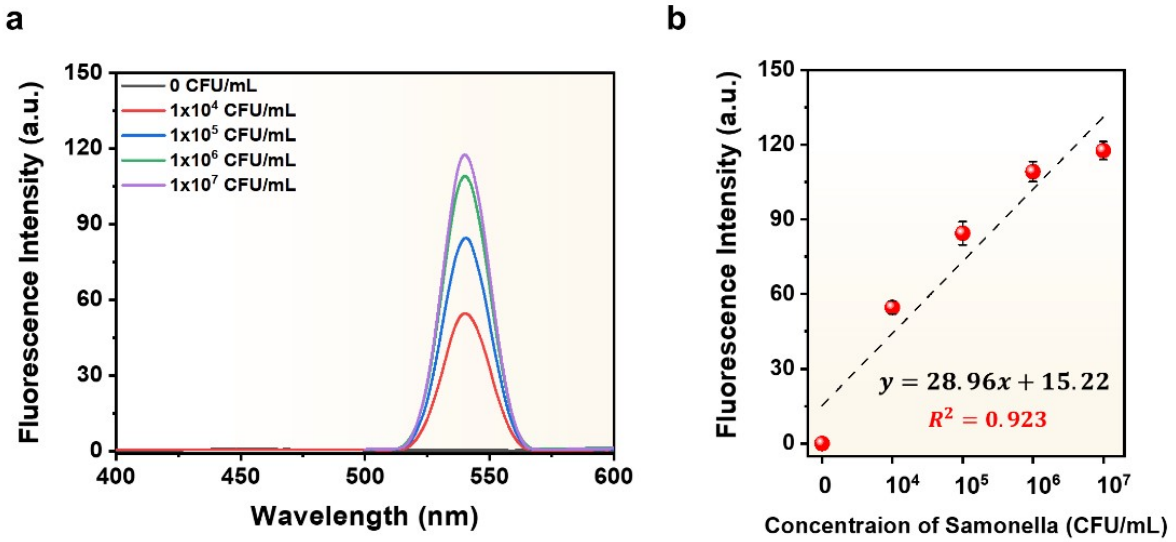


Fig. S5. (a) Fluorescence spectra for different *Salmonella* concentrations from $1x10^4$, $1x10^5$, $1x10^6$, $1x10^7$ CFU/mL in eggs. (b) Calibration curve and linearity results for fluorescence intensity after 15 minutes of exposure to different *Salmonella* concentrations. (ranging from 500 to 600 nm)