Supporting Information

SI text

S1 Principles of Fluorescence Quenching

If the quenching mechanism belongs to the dynamic quenching, it should follow the well-known Stern-Volmer equation, [28]

$$F_0 / F = 1 + K_{sv}[Q] = 1 + \mathrm{K_q}\tau_0[\mathrm{Q}] \qquad (1)$$

where F_0 and F denote the steady-state fluorescence intensities in the absence and presence of quencher, respectively. K_q is the quenching rate constant of the biological macromolecule; K_{sv} is the Stern–Volmer quenching constant; [Q] is the concentration of quencher; τ_0 is the average lifetime of the molecule without any quencher and the fluorescence lifetime of the biopolymer is 10^{-8} s. [28]

If not, the fluorescence quenching of CAT should be analyzed using the modified Stern–Volmer equation: [18]

$$\frac{F_0}{\Delta F} = \frac{1}{f_a K_a}\frac{1}{[Q]} + \frac{1}{f_a} \qquad (2)$$

In that case, ❒F is the difference in fluorescence intensity between the absence and presence of the quenching compound at concentration [Q]; K_a is the effective quenching constant for the accessible fluorophores, and f_a is the fraction of accessible fluorescence. The dependence of F_0/❒F on the reciprocal value of the quenching compound concentration $[\mathrm{Q}]^{-1}$ is linear, with slope equal to the value of $(f_aK_a)^{-1}$.

S2 Analysis on Thermodynamic Parameters and Binding Modes

If the temperature only changes a little, the enthalpy change (ΔH) can be regarded

as a constant in the formula below: [28]

$$\ln\left(\frac{K_2}{K_1}\right) = \frac{\Delta H}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right) \quad (3)$$

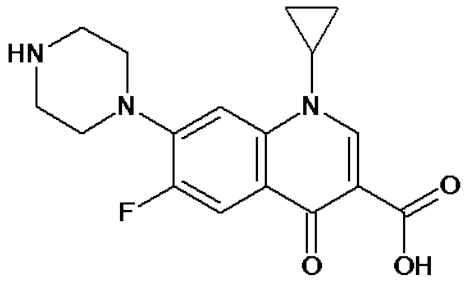
$$\Delta G = \Delta H - T\Delta S = -RT \ln K \quad (4)$$

where K_1 and K_2 are the binding constants (analogous to K_a in Equation 2) at T_1 and T_2, and R is the universal gas constant.

For a static quenching interaction, the binding constant (K_b) and the number of binding sites (n) can be determined using the following formula, [18]

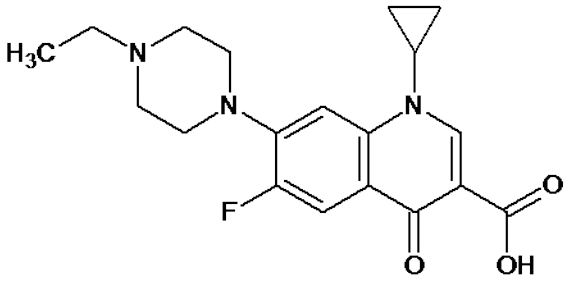
$$\log\frac{F_0 - F}{F} = \log K_b + n\log[Q] \quad (5)$$

where F_0, F, and [Q] are the same as in Equation 2; K_b is the binding constant and n is the number of binding sites per molecule.



ciprofloxacin

(CPFX)



enrofloxacin

(ENFX)

Scheme S1 Molecular structure of CPFX and ENFX.

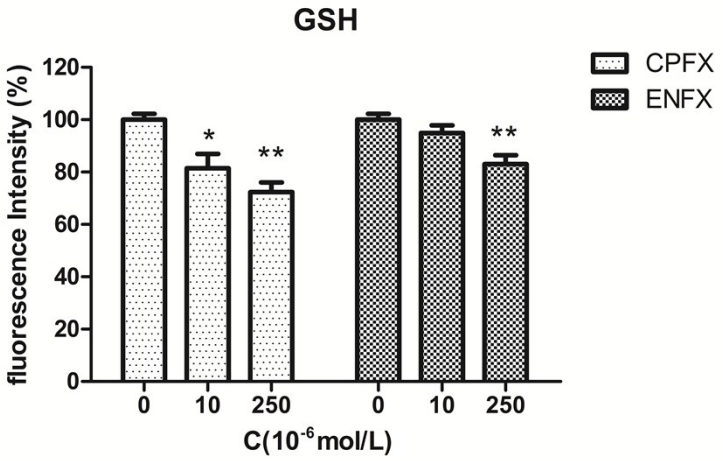


Fig. S1 Average amount of GSH in single erythrocytes incubated with CPFX and ENFX.[18]

Statistical significance vs control group: ∗p<0.05, ∗∗p<0.01; The values ± standard deviations were estimated from 180 individual cells.[18]

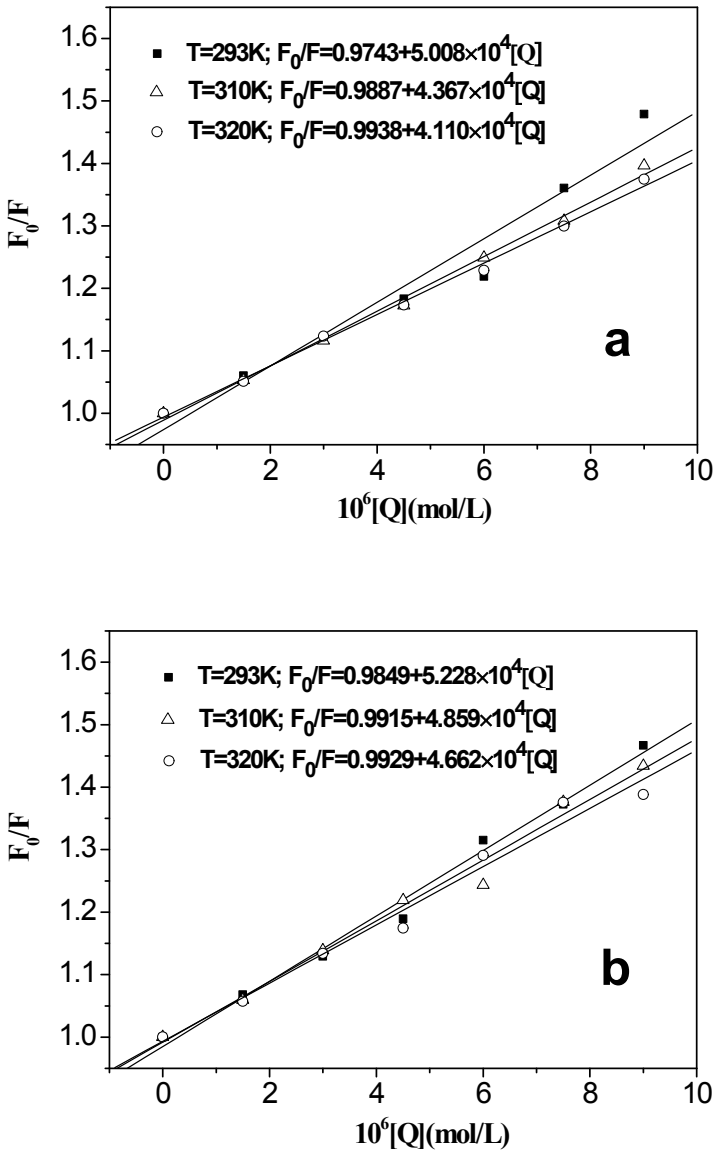


Fig. S2 Stern–Volmer plots of CPFX (a) and ENFX (b) quenching with Cu/Zn-SOD at three different temperatures

Conditions: Cu/Zn-SOD: 3×10^{-6} mol/L； Buffer: NaH_2PO_4/Na_2HPO_4, pH=7.4.

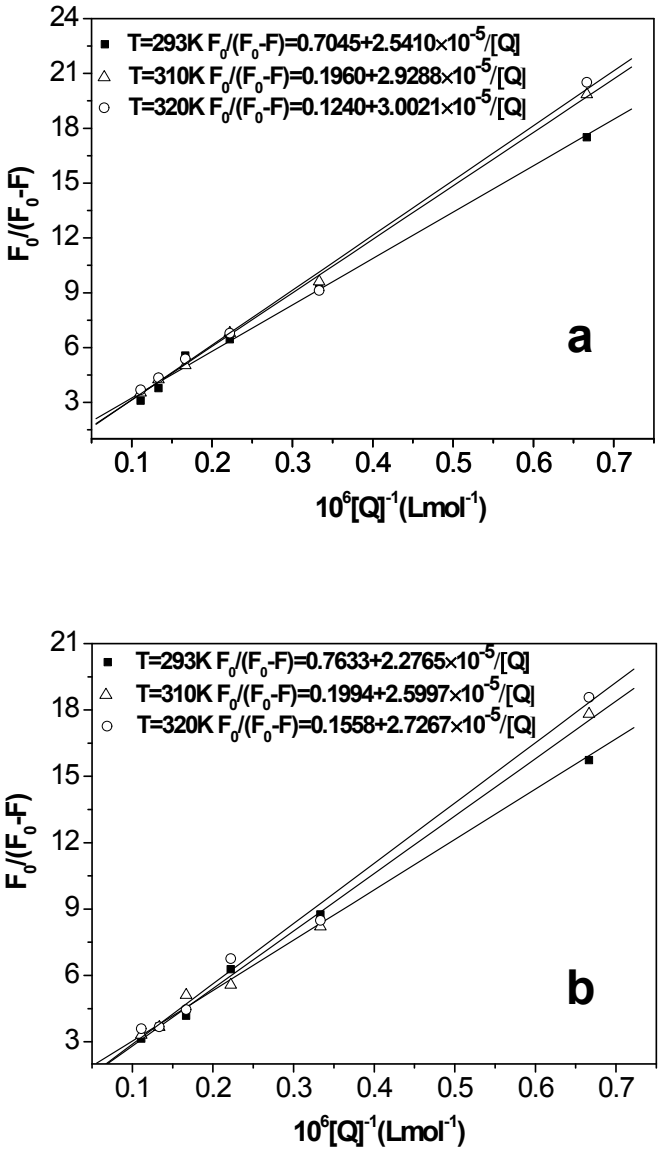


Fig. S3 Modified Stern–Volmer plots for the quenching of Cu/Zn-SOD by CPFX (a) and ENFX (b) at different temperatures

Conditions: Cu/Zn-SOD: 3×10^{-6} mol/L； Buffer: NaH_2PO_4/Na_2HPO_4, pH=7.4.

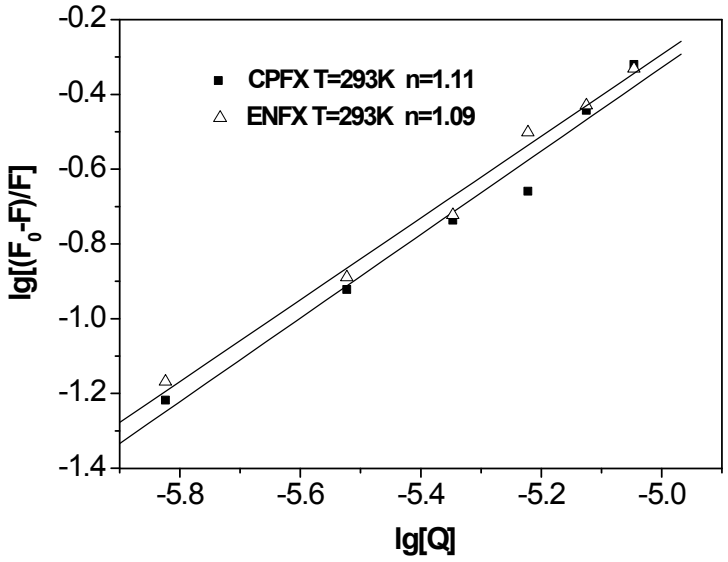


Fig. S4 Plots of log [(F_0 - F)/F] vs log [Q] for the binding of CPFX (■) and ENFX (❒) to Cu/Zn-SOD at 293K.

Table S1 Stern–Volmer quenching constants for the interaction of both CPFX and ENFX with Cu/Zn-SOD at different temperatures

	T(K)	K_{sv}（$\times 10^4$ $L mol^{-1}$）	k_q（$\times 10^{12}$ $L mol^{-1} s^{-1}$）	R	SD
CPFX	293	5.008	5.008	0.9790	0.0376
	310	4.367	4.367	0.9976	0.0108
	320	4.110	4.110	0.9982	0.0087
ENFX	293	5.228	5.228	0.9949	0.0189
	310	4.859	4.859	0.9927	0.0209
	320	4.662	4.662	0.9895	0.0242

Table S2 Binding parameters for FQ/SOD interactions at pH 7.4

	T(K)	K_a ($\times 10^4$ $Lmol^{-1}$)	R	ΔH $KJ \cdot mol^{-1}$	ΔG $KJ \cdot mol^{-1}$	ΔS $J \cdot mol^{-1}$
CPFX	293	2.76	0.9974	-62.24	-24.91	-127.41
	310	0.68	0.9995		-22.75	-127.39
	320	0.41	0.9967		-22.14	-125.31
ENFX	293	3.35	0.9974	-65.33	-25.39	-136.31
	310	0.77	0.9964		-23.07	-136.32
	320	0.57	0.9964		-23.01	-132.25