a. Thermodynamics of roGFP2. Mathematically, the Grx-mediated exchange of electrons between glutathione and roGFP2 can be described by the Nernst equilibrium $E_{GSH} = E_{roGFP2}$, specifically

$$\begin{aligned} E_{GSH} &= E'^{\circ}_{GSH} - \frac{RT}{2F}\ln\left(\frac{[GSH]^2}{[GSSG]}\right) \\ &= E'^{\circ}_{roGFP2} - \frac{RT}{2F}\ln\left(\frac{[roGFP2_{red}]}{[roGFP2_{ox}]}\right) \\ &= E_{roGFP2} \end{aligned}$$

In this equation, R is the gas constant (8.315 J K^{-1} mol^{-1}), T the absolute temperature (298.15 K), and F the Faraday constant (96,485 C mol^{-1}). E'°_{GSH} is −240 mV (103) and E'°_{roGFP2} has been determined as −280 mV (27). For practical purposes, it is ex-