The encounter rate between G · GDPs and a single Rh* is predicted by this theory to be

$$\nu_{\text{enc}}(t) = \frac{4\pi(D_{\text{Rh}} + D_{\text{G}})C_G}{\ln\left[4(D_{Rh} + D_{\text{G}})t/\rho^2\right] - 2\gamma} \tag{2}$$

Here C_{G} is the initial surface density of G-protein on the disc surface; ρ, the encounter radius, is taken to be the sum of the radii of Rh* and G · GDP (5 nm; cf. Ref. 118); $\gamma = 0.57722$ is Euler's constant. Eqn. 2 is a first-order approximation of a more complicated expression, and is valid to within 10% when the denominator exceeds a value of 6. Thus, for the parameters of the amphibian rod at room temperature, the approximation is valid to within 10% for $t > 4$ ms; at longer times the expression becomes more accurate.

The expression in Eqn. 2 may be further simplified. Although the denominator is time-dependent, it is only weakly so because the time dependence resides in a logarithmic term. Substituting the values $D_{\text{Rh}} = 0.7$ $\mu\text{m}^2\ \text{s}^{-1}$, $D_{\text{G}} = 1.2\ \mu\text{m}^2\ \text{s}^{-1}$ and $\rho = 0.005\ \mu\text{m}$, one finds that at $t = 50$ ms the denominator in Eqn. 2 equals 8.5, and that a 10-fold increase or decrease in t alters the denominator by only about $\pm 30\%$. Hence, for practical purposes, and over the time range 5–500 ms after a photoisomerization, Eqn. 2 can be simplified to

$$\nu_{\text{enc}}(t) \approx 1.5(D_{\text{Rh}} + D_{\text{G}})C_{\text{G}}. \tag{3}$$

Thus, for our purposes the encounter rate may be taken to be roughly independent of time. Substitution of the parameter values above yields $\nu_{\text{enc}} \approx 7000\ \text{s}^{-1}$ at $t = 50$ ms in an amphibian rod at 22°C.