**Derivation**

To incorporate the Y731 conformational motion between the stacked and flipped forms into our model, we assume that the interconversion between the stacked and flipped conformations occurs independently of the location of the radical and remains at equilibrium throughout the entire radical transfer process. We also assume that Y731 must be flipped toward the interface for radical transfer to occur between Y356 and Y731, and that Y731 must be in the stacked position for radical transfer to occur between Y730 and Y731.

Thus, the radical transfer moves in the forward direction from Y356 to flipped Y731, the flipped Y731 interconverts to stacked Y731, at which point the radical is now able to transfer to Y730. Here *k*s and *k*f correspond to the rate constants for interconversion from flipped to stacked and from stacked to flipped, respectively. The final rate constant expressions are given in terms of the equilibrium constant  and the total concentration of Y731 radical, which is the sum of the concentrations of the stacked and flipped conformations.























