Nanosecond Laser Flash Photolysis Study of Rose Bengal

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Rose bengal (RB) is a well-known xanthene dye used in photodynamic therapy, textile industry and cosmetics. [1] Here we report a detailed and complete mechanistic study involving the triplet excited state (Figure 1) and oxidized and reduced forms of RB as short-lived intermediates. The kinetics of these species was obtained by steady–state spectroscopic and kinetic nanosecond laser flash photolysis using a 532 nm laser as a source of excitation. Scheme 1 summarizes the processes that can be involved upon RB excitation. This detailed investigation is an essential step towards understanding of its role in the photochemical tissue bonding. [2]

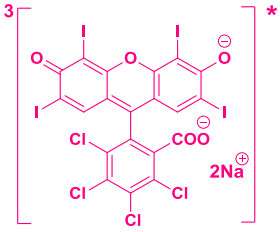

Figure 1. Excited triplet state of RB

$$RB^{2-} \xrightarrow[2.\ \text{isc}]{1.\ h\nu} {}^3RB^{2-} \xrightarrow[k_d]{} RB^{2-}$$

$${}^3RB^{2-} + RB^{2-} \xrightarrow[k_{sq}]{} 2\ RB^{2-}$$

$${}^3RB^{2-} + RB^{2-} \xrightarrow[k_{redox^*}]{} RB^{\bullet -} + RB^{\bullet 3-}$$

$${}^3RB^{2-} + {}^3RB^{2-} \xrightarrow[k_{TT}]{} {}^1RB^{2-} + RB^{2-}$$

$${}^3RB^{2-} + {}^3RB^{2-} \xrightarrow[k_{redox^{**}}]{} RB^{\bullet 3-} + RB^{\bullet -}$$

$$RB^{\bullet 3-} + RB^{\bullet -} \xrightarrow[k_{-eT}]{} 2\ RB^{2-}$$

Scheme 1. Photochemistry of RB

[1] I. E. Kochevar and R. W. Redmond, *Singlet Oxygen, Uv-a, and Ozone*, 2000, **319**, 20-28.

[2] T. S. Johnson, A. C. O'Neill, P. M. Motarjem, C. Amann, T. Nguyen, M. A. Randolph, J. M. Winograd, I. E. Kochevar and R. W. Redmond, *J. Surg. Res.*, 2007, **143**, 224-229.