

Singlet Oxygen Trapping by DRD156 in Micellar Solutions

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Recently, 4,4'-bis(1-p-carboxyphenyl-3-methyl-5-hydroxyl)-pyrazol (DRD156) has been developed as a new sensitive reagent that reacts specifically with singlet oxygen. The specificity of DRD156 for singlet oxygen in a biomimetic solution (micellar solution) and the effects of its coexistence with other reagent were examined by the electron spin resonance (ESR). Singlet oxygen was generated from photosensitization. The ESR spectrum of the radical derived from DRD156 after the reaction with singlet oxygen in phosphate buffer (PBS) was comprised of twenty-nine lines, whereas that in cetyltrimethylammonium bromide (CTAB) was comprised of nine lines. Both 2,2,6,6-tetramethyl-4-piperidine (TMPD) and 1,3-diphenyl-isobenzofuran (DPBF) reduced the singlet oxygen-DRD156 signal intensity, and TMPD-mediated decrease was the same in PBS (to 62%) as in CTAB micelle (to 65%). In contrast, DPBF reduced the DRD156 signal intensity more effectively in CTAB micelle (to 12%!) than PBS (to 38%). These results indicated that the specificity of DRD156 for singlet oxygen is dependent on the micro-environment of the micelles.