Radiationless Deactivation of Doubly Thiazole Orange Labeled DNA

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ABSTRACT:

Recently, hybridization-sensitive fluorescent probe for live cell imaging using on-off switching of fluorescence emission of doubly thiazole orange labeled nucleotide was newly synthesized [1]. The probe investigated in the previous study is highly selective to the target since the bases of the probe are designed to be complementary to a known base sequence of the target. The probes show low (off state) and high (on state) fluorescence intensity before and after hybridization with targets.

The radiationless deactivation of doubly TO labeled DNA were investigated by absorption and fluorescence spectrum analysis in the various conditioned solvent. The change of absorption peak shape and the fluorescence quantum yield are quantitatively comparable with the previously reported results. The decreased quantum yield of the probe in the organic solvent(alcohol, DMSO) is explained by the ease of torsional rotation of methine bridge in the monomeric form of the dye. The decrease of quantum yield according to the decrease of weight fraction of the viscous solvent are explained by the fraction increase of water molecules [2] or by decrease of solvent viscosity. Both of them were known factors that contribute to the rotation of the methine bridge. The quantum yield measured in sucrose solvent comparable with that of the glycerine solvent at the similar viscosity can be explained by the viscosity-dependent rotation of methine bridge of the probe. Our result and further characterization of molecular properties for the probes will be useful for in vitro and live cell applications combinational using of FCS/FCCS, SMD, and FLIM in addition to LSM imaging.

References