Electronic Excitation Energy Transfer of Prodan-ORB and Laurdan-ORB Systems in Model Phospholipid Membranes

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Electronic energy transfer between prodan (6-propionyl-2-dimethylaminonaphthalene) and laurdan (6-dodecanoyl-2-dimethylaminonaphthalene) acting as donors and ORB (octadecyl rhodamine B) acting as acceptor in a model system of membranes has been studied by a steady-state fluorescence quenching analysis. Factors determining the energy transfer rate were considered with special attention to the contribution from the spectral heterogeneity of the donor molecules. By analyzing experimental data within the framework of two theoretical models (developed by Stern, Volmer, and Lehrer) of the energy transfer in two-dimensional systems, the limits of the range of possible prodan and laurdan positions with respect to a lipid bilayer have been estimated.

Key words: Fluorescence Quenching; Resonance Energy Transfer; Phospholipid Vesicles; Distance Estimation in Membrane.