LIST OF FIGURES

Figure 1. The two-state model of solvent relaxation (page no. 9).

Figure 2. The continuous model of solvent relaxation (page no. 13).

Figure 3. Chemical structures of the fluorophores used in this study (page no. 22).

Figure 4. Fluorescence emission spectra of NBD-PE in multilamellar vesicles of DOPC at different excitation wavelengths (page no. 28).

Figure 5. Effect of changing excitation wavelength on the wavelength of maximum emission for NBD-PE in DOPC vesicles (page no. 31).

Figure 6. Fluorescence polarization of NBD-PE as a function of excitation wavelength in chloroform and in DOPC vesicles (page no. 34).

Figure 7. Time-resolved fluorescence intensity decay of NBD-PE in unilamellar vesicles of DOPC (page no. 38).

Figure 8. Mean fluorescence lifetime of NBD-PE in DOPC vesicles as a function of excitation wavelength (page no. 41).

Figure 9. Fluorescence lifetime of NBD-PE in DOPC vesicles as a function of emission wavelength (page no. 44).

Figure 10. Fluorescence polarization of NBD-PE as a function of emission wavelength in chloroform and in DOPC vesicles (page no. 46).

Figure 11. Effect of changing excitation wavelength on the wavelength of maximum emission for DPH in DOPC vesicles (page no. 52).

Figure 12. (a) Structure of NBD-AHA; (b) Structures of NBD derivatives I-III used for calculation of dipole moment change (page no. 61).

Figure 13. Dependence of Stokes’ shift ($\bar{v}_e - \bar{v}_g$) of NBD-AHA on orientation polarizability (page no. 68).

Figure 14. Electronic charge densities at the ground and excited states for the NBD derivatives I-III (page no. 71).

Figure 15. Effect of changing excitation wavelength on the wavelength of maximum emission for gramicidin A' in DOPC vesicles (page no. 85).

Figure 16. Fluorescence polarization of gramicidin A' as a function of excitation wavelength in methanol, and in DOPC vesicles (page no. 88).
Figure 17. Time-resolved fluorescence intensity decay of gramicidin A' in unilamellar vesicles of DOPC (page no. 93).

Figure 18. Mean fluorescence lifetime of gramicidin A' in DOPC vesicles as a function of excitation wavelength (page no. 96).

Figure 19. Mean fluorescence lifetime of gramicidin A' in DOPC vesicles as a function of emission wavelength (page no. 99).

Figure 20. Fluorescence polarization of gramicidin A' as a function of emission wavelength in methanol, and in DOPC vesicles (page no. 102).

Figure 21. Time resolved emission spectra (TRES) of gramicidin A' in DOPC vesicles at (a) early time points, and (b) late time points (page no. 104).

Figure 22. A schematic diagram of the membrane bilayer showing the orientation and location of gramicidin A (page no. 112).

Figure 23. Effect of changing excitation wavelength on the wavelength of maximum emission for 2-AS and 12-AS in multilamellar vesicles of DOPC (page no. 119).

Figure 24. Fluorescence polarization of 2-AS and 12-AS in multilamellar vesicles of DOPC as a function of excitation wavelength (page no. 122).

Figure 25. Fluorescence polarization of 2-AS and 12-AS in multilamellar vesicles of DOPC as a function of emission wavelength (page no. 124).

Figure 26. Effect of changing excitation wavelength on the wavelength of maximum emission for NBD-cholesterol in (a) the fluid phase, and (b) the gel phase in unilamellar vesicles of DPPC (page no. 126).

Figure 27. Fluorescence polarization of NBD-cholesterol in (a) the fluid phase, and (b) the gel phase in unilamellar vesicles of DPPC as a function of excitation wavelength (page no. 129).

Figure 28. A schematic diagram of half of the membrane bilayer showing the localizations of the anthroyloxy groups of 2-AS and 12-AS at pH 5.0 in DOPC vesicles (page no. 132).

Figure 29. A schematic diagram of half of the membrane bilayer showing the localizations of the anthroyloxy groups of NBD-PE and NBD-cholesterol in membrane vesicles (page no. 134).