



REFERENCES

- Andersen, C.H. Probes of membrane structure. *Ann. Rev. Biochem.* 47 (1978) : 359 - 383.
- Antunes - Madeira, M.C. and Madeira, M.C.V. Membrane fluidity as affected by the organochlorine insecticide DDT. *Biochim. Biophys. Acta.* 1023 (1990) : 469 - 474.
- Bangham, D.A. Properties and uses of lipid vesicles : An overview. *Ann. New York. Acad. Sci.* 308 (1978) : 2 - 7.
- Bartucci, R. and Sportelli, L. Spin label ESR study of the effects of monovalent cations, anions and chaotropics on DPPC multilayers. *Biochim. Biophys. Acta.* 1195(1994) : 229 - 236.
- Borenstain, V. and Barenholz, Y. Characterization of liposomes and other lipid assemblies by multiprobe fluorescence polarization. *Chem. Phys. Lipids.* 64 (1993) : 117 - 127.
- Cohen, B.L., Salzberg, M.B. and Grinvald, A. Optical methods for monitoring neuron activity. *Ann. Rev. Neurosci.* 1 (1978) : 171 - 182.
- De. Gier., J., Mandersloot, G.J. and Van Deenen, M.L.L. Lipid composition and permeability of liposomes. *Biochim. Biophys. Acta.* 150 (1968) : 666 - 675.
- De Kruyff, B., Demel, A.R., Slotboom, J.A. The effect of the polar headgroup on the lipid-cholesterol interaction : A monolayer and differential scanning calorimetry study. *Biochim. Biophys. Acta.* 307 (1973) : 1 - 19.

- Delia, L.B. and Disalro, A.E. Gel state surface properties of phosphatidylcholine liposomes as measured with merocyanine 540. *Biochim. Biophys. Acta.* 732 (1983) : 387 - 393.
- Delmelle, M., Dufrane, P.S., Brasseur, R. and Rutsschaert, M.J. Clustering of gangliosides in phospholipid bilayers. *FEBS.* 121 (1980) : 11 - 14.
- Demel, A.R., and Kruyff, DE.B. The function of sterols in membranes. *Biochim. Biophys. Acta.* 457(1976):109-132.
- Dodin, G., Aubard, J. and Falque, D. Thermodynamic and kinetic studies of the interaction of merocyanine 540 with hydrophobic aggregates.I. Binding of merocyanine-540 to sodium dodecyl sulfate micelle. *J. Phys. Chem* 91 (1987) : 1166 - 1172.
- Eletr, S. and Inest, G. Phospholipid orientation in sarcoplasmic membranes:spin - label ESR and proton NMR studies. *Biochim. Biophys. Acta.* 282 (1972):174 - 179.
- Estep, N.T., Mountcastle, B.D.and Thompson, E.T. Studies on the anomalous thermotropic behavior of aqueous dispersions of dipalmitoylphosphatidylcholine - cholesterol mixtures. *Biochemistry.* 17 (1978) : 1984 - 1989.
- Gier, M.C. and Blok, C.M. Relations between liposomes and membranes. *Ann. New York. Acad. Sci.* 308 (1978) : 85 - 100.

- Glagasigij, U., Sato, Y. and Suzuki, Y. Characterization of immunoliposome membrane : ESR spectroscopic analysis of the effect of cholesterol derivatives in membrane. *Chem. Pharm. Bull.* 36(1988) : 1589 - 1592.
- _____. Alteration of immunolysis reaction on liposome membrane by various cholesterol analogues. *Chem. Pharm. Bull.* 36 (1988) : 4192 - 4198.
- Goodrich, P.R., Handel, M.T. and Baldeschwieler, D.J. Modification of lipid phase behavior with membrane - bound cryoprotectants. *Biochim. Biophys. Acta.* 938 (1988) : 143 - 154.
- Grant, M.C., Wu, H.S. and McConnell, M.H. Lateral phase separations in binary lipid mixtures: correlation between spin label and freeze - fracture electron microscopic studies. *Biochim. Biophys. Acta.* 363(1974):151-158.
- Gregoriadis, G. *Liposome Technology*. 2nd ed. Vol. 1: Liposome preparation and related techniques. London: CRC Press, 1993.
- Grof, P. and Belagyi, J. The effect of anaesthetics on protein conformation in membranes as studied by the spin - labelling technique. *Biochim. Biophys. Acta.* 734(1983) : 319 - 328.
- Harris, S.J., Epps, E.D. and Davio, R.S. Evidence for transbilayer, tail-to-tail cholesterol dimers in dipalmitoylglycerophosphocholine liposomes. *Biochemistry.* 34(1995) : 3851-3857.

- Hitchcock, B.P., Mason, R., Thomas, M.K. and Shipley, G.G. Structural chemistry of 1,2-dilauroyl-DL-phosphatidylethanolamine: Molecular conformation and intermolecular packing of phospholipids. *Proc. Nat. Acad. Sci. USA.* 71 (1974): 3036 - 3040.
- Ikemoto, N., Sreter, A.F., and Gergely, I. Structure features of the surface of the vesicles of FSR - lack of functional role in Ca^{+2} uptake and ATPase activity. *Arch. Biochem. Biophys.* 147 (1971): 571 - 582.
- Jacobson, K. and Wobschall, D. Rotation of fluorescent probes localized with lipid bilayer membranes. *Chem. Phys. Lipids.* 12 (1974): 117 - 131.
- Jos, A.F. Op den Kamp. Lipid asymmetry in membranes. *Ann. Rev. Biochem.* 48 (1979): 47 - 71.
- Kenneth, E. E. and Sunney, I.C. The effect of surface curvature on the head - group structure and phase transition properties of phospholipid bilayer vesicle. *Biochim. Biophys. Acta.* 599 (1980): 330 - 335.
- _____, and Roseman, A.M. Effect of cholesterol, fatty acyl chain composition, and bilayer curvature on the interaction of cytochrome b_5 with liposomes of phosphatidylcholine. *Biochemistry.* 34 (1995): 3841 - 3850.
- Klausner, D.R., Kleinfeld, M.A., Hoover, L.R. and Karnovsky, J.M. Lipid domains in membranes. *J. Biol. Chem.* 255(1980): 1286 - 1295.

- Kragh-hansen, U., and Moller, V.J. Protein binding of small molecules., II. Role of electrostatic forces for binding of phenol red by human serum albumin. *Biochim. Biophys. Acta.* 295 (1973) : 447 - 456.
- Kusumi, A., Subczynski, K.W. and Pasenkiewicz-Gierula, M. Spin label studies on phosphatidylcholine - cholesterol membranes : effects of alkyl chain length and unsaturation in the fluid phase. *Biochim. Biophys. Acta.* 854 (1986): 307 - 317.
- Ladbroke, D.B., Williams, M.R. and Chapman, D. Studies on lecithin - cholesterol - water interactions by differential scanning calorimetry and X - ray diffraction. *Biochim. Biophys. Acta.* 150 (1968) : 333 - 340.
- _____ and Chapman, D. Thermal analysis of lipids, proteins and biological membranes : A review and summary of some recent studies. *Chem. Phys. Lipids.* 3 (1969) : 304 - 367.
- Langner, M. and Hui, W.S. Merocyanine interaction with phosphatidylcholine bilayers. *Biochim. Biophys. Acta.* 1149 (1993) : 175 - 179.
- Lentz, R.B. Use of fluorescent probes to monitor molecular order and motions within liposome bilayers. *Chem. Phys. Lipids.* 64 (1993) : 99 - 116.
- _____. Membrane fluidity as detected by diphenyl-hexatriene probes. *Chem. Phys. Lipids.* 50 (1989) : 171 - 190.

- _____, Barrow, A.D. and Hoehli, M. Cholesterol-phosphatidylcholine interactions in multilamellar vesicles. *Biochemistry*. 19 (1980) : 1943 - 1954.
- _____, Frlire, E. and Biltonen, L.R. Fluorescence and calorimetric studies of phase transition in phosphatidylcholine multilayers : Kinetics of the pretransition. *Biochemistry*. 17 (1978) : 4475 - 4480.
- _____, Barenholz, Y. and Thompson, E.T. Fluorescence depolarization studies of phase transitions and fluidity in phospholipid bilayers. 1. Single component phosphatidylcholine liposomes. *Biochemistry*. 15(1976) : 4521- 4528.
- _____. Fluorescence depolarization studies of phase transitions and fluidity in phospholipid bilayers. 2. Two component phosphatidylcholine liposomes. *Biochemistry*. 5 (1976) : 4529 - 4537.
- Marsh, D. and Smith, C.P.I. An interacting spin label of the fluidizing and condensing effects of cholesterol on lecithin bilayers. *Biochim. Biophys. Acta*. 298 (1973) : 133 - 144.
- McIntosh, J.T. The effect of cholesterol on the structure of phosphatidylcholine bilayers. *Biochim. Biophys. Acta*. 513 (1978) : 43 - 58.
- McMullen, P.W.T., and McElhaney, N.R. New aspects of the interaction of cholesterol with dipalmitoylphosphatidylcholine bilayers as revealed by high sensitivity differential scanning calorimetry. *Biochim. Biophys. Acta*. 1234(1995): 90 - 98.

- Mely-goubert, B. and Freedman, H.M. Lipid fluidity and membrane protein monitoring using 1,6-diphenyl-1,3,5-hexatriene. *Biochim. Biophys. Acta.* 601(1980):315 - 327.
- Nakamaru, Y., Hori, H. and Mitsui, T. Conformational change in sarcoplasmic reticulum induced by ATP in the presence of magnesium ion and calcium ion. *J. Biochem.* 72 (1972) : 635 - 646.
- _____, and Sugii, Y. Bromcresol purple as probe for structural features of fragmented sarcoplasmic reticulum. *J. Biochem.* 75 (1974) : 1331 - 1339.
- _____, and Nomura, K. Two types of sarcoplasmic reticulum - orthophosphate interactions observed with dye probe. *J. Biochem.* 81 (1977) : 321 - 328.
- _____. Dimer formation of bromcresol purple anions on the phosphorylated intermediate of sarcoplasmic reticulum. *J. Biochem.* 82 (1977) : 1189 - 1195.
- New, R.R.C. *Liposome: a practical approach*. Oxford: IRL Press, 1989.
- Ostro, J.M. *Liposomes from biophysics to therapeutics*. New York : Marcel Dekker, Inc., 1987.
- Patel, R.K., Schuh, J.R., Li, P.M. and Baldeschwieler, D.J. Modification of vesicle surfaces with amphiphilic sterols. Effect on permeability and in vivo tissue distribution. *Biochim. Biophys. Acta.* 814 (1985) : 256 - 264.
- _____. The pharmacological efficacy of a rigid non-phospholipid liposome drug delivery system. *Biochim. Biophys. Acta.* 797 (1984) : 20 - 26.

- Paulo, F.F.A., Vaz, L.C.W. and Thompson, E.T. Lateral diffusion and percolation in two - phase, two - component lipid bilayer. *Biochemistry*. 31 (1992) : 7198 - 7210.
- Perochon, E., Lopez, A. and Tocanne, F.J. Polarity of lipid bilayers : A fluorescence investigation. *Biochemistry*. 31 (1992) : 7672 - 7682.
- Peter, I.L. and Israel, R.M. Perturbations of membrane structure by optical probe : I. Location and structural sensitivity of merocyanine 540 bound to phospholipid membranes. *J. Membrane Biol.* 52 (1980) : 1 - 15.
- _____, Diana, B. and Israel, R.M. Perturbations of membrane structure by optical probes : II. Differential scanning calorimetry of dipalmitoyllecithin and its analogs interacting with merocyanine 540. *J. Membrane Biol.* 54 (1980) : 141 - 148.
- Phillips, C.M. and Finer, G.E. The stoichiometry and dynamics of lecithin - cholesterol clusters in bilayer membranes. *Biochim. Biophys. Acta.* 356 (1974) : 199 - 206.
- _____, Ladbroke, D.B. and Chapman, D. Molecular interaction in mixed lecithin systems. *Biochim. Biophys. Acta.* 196 (1970) : 35 - 44.
- Presti, T.F., Pace, J.R. and Chan, I.S. Cholesterol - phospholipid interaction in membranes. 2. Stoichiometry and molecular packing of cholesterol - rich domain. *Biochemistry*. 21 (1982) : 3831 - 3835.

- Rogers, J., Lee, G.A. and Wilton, C.D. The organization of cholesterol and ergosterol in lipid bilayers based on studies using non-perturbing fluorescent sterol probes. *Biochim. Biophys. Acta.* 552 (1979) : 23 - 37.
- Rubenstein, R.J., Smith, A.B. and McConnell, M.H. Lateral diffusion in binary mixtures of cholesterol and phosphatidylcholines. *Proc. Nat. Acad. Sci. USA.* 76(1979):15-18.
- Sabra, C.M., Jorgensen, K. and Mouritsen, G.O. Calorimetric and theoretical studies of the effects of lindane on lipid bilayers of different acyl chain length. *Biochim. Biophys. Acta.* 1233 (1995) : 89 - 104.
- Sankaram, B.M. and Thompson, E.T. Interaction of cholesterol with various glycerophospholipids and sphingomyelin. *Biochemistry.* 29 (1990) : 10670 - 10675.
- Sarkar, N.S., Balasubramanian, V.S. and Sikdar, K.S. Effect of fenvalerate, a pyrethroid insecticide, on membrane fluidity. *Biochim. Biophys. Acta.* 1147(1993) : 137-142.
- Sato, B., Nishikida, K., Samuels, T.L. and Tyler, H.F. Electron spin resonance studies of erythrocytes from patients with Duchenne Muscular Dystrophy. *J. Clin. Invest.* 61 (1978) : 251 - 259.
- Schootemeijer, A. et al. Relation between membrane fluidity and signal transduction in the human megakaryoblastic cell line MEG-01. *Biochim. Biophys. Acta.* 1236 (1995): 128-134.

- Shimoyama, Y., Goran Eriksson, E.L. and Ehrenberg, A. Molecular motion and order in oriented lipid multibilayer membranes evaluated by simulations of spin label ESR spectra. *Biochim. Biophys. Acta.* 508 (1978):213 - 235.
- Shimshick, J.E. and McConnell, M.H. Lateral phase separation in phospholipid membranes. *Biochemistry.* 12(1973): 2351 - 2360.
- _____. Lateral phase separations in binary mixtures of cholesterol and phospholipids. *Biochim. Biophys. Res. Commun.* 53 (1973) : 446 - 451.
- Shinitzky, M and Barenholz, Y. Fluidity parameters of lipid regions determined by fluorescence polarization. *Biochim. Biophys. Acta.* 515 (1978) : 367 - 394.
- Slotte, J.P. Lateral domain formation in mixed monolayers containing cholesterol and dipalmitoylphosphatidylcholine or *N*-palmitoylsphingomyelin. *Biochim. Biophys. Acta.* 1235 (1995) : 419 - 427.
- Tasaki, I. and Warashina, A. Dye - membrane interaction and its changes during nerve excitation. *Photochem. Photobiol.* 24 (1976) : 191 - 207.
- Tocanne, J., Dupou-Cezanne, L. and Lopez, A. Lipid lateral diffusion and membrane organization. *FEBS.* 257(1989): 10 - 16.
- Vaz, L.C.W. Diffusion and chemical reactions in phase-separated membranes. *Biophys. Chem.* 50 (1994):139-145.

_____, Melo, C.C.E. and Thompson, E.T. Fluid phase connectivity in an isomorphous, two - component, two - phase phosphatidylcholine bilayer . *J. Biophys. Society.* 58 (1990) : 273 - 275.

Velez, M., Lillo, M.P., and Acuna, A.U. Cholesterol effect on the physical state of lipid multibilayers from the platelet plasma membrane by time-resolved fluorescence. *Biochim. Biophys. Acta.* 1235 (1995) : 343 - 350.



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