

MEASURING PERMEABILITY OF LIPID MEMBRANES TO H⁺ AND ACIDS

Carolyn B. Newham and Pratik P. Patel, Department of Biology

Faculty Sponsor: Dr. Yakov Y. Woldman, Department of Chemistry

Transport through cellular membranes plays a defining role in biological systems. The focus of this research is to study the passive permeability of lipid membranes for small molecules using lipid vesicles (liposomes) as a model. A fluorescent probe that cannot permeate through the membrane was encapsulated inside the liposomes. The spectrum of the probe is pH dependent allowing the H⁺ ion concentration to be measured. Various acids and salts were added to the medium outside of the liposomes. Due to the penetration of H⁺ or non-dissociated acid molecules through the membrane, the pH inside the liposomes will change. This causes the change in the spectrum of the fluorescent probe inside the liposomes, which was recorded. Phosphatidylcholine, the major component of bacterial and eukaryotic membranes, was used to measure the permeability of lipid membranes in this study.