CHARACTERIZATION OF MEMBRANE VISCOSITY CHANGES WITH THE NOVEL MOLECULAR ROTOR FCVJ

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SHORT ABSTRACT

Membrane viscosity can be defined as the “thickness” of a cell membrane. Membrane viscosity conditions are a useful indicator of cell health. Many diseases have been reported to induce changes in afflicted cell membrane viscosity. Characterizing membrane viscosity will provide researchers and clinicians with a valuable tool in diagnosing the onset and progression of diseases. Molecular rotors are fluorescent molecules that have been shown to exhibit viscosity sensitive .

DLPC liposomes were formed with the molecular rotor FCVJ incorporated into the membrane. A cuvette with liposomes was excited at 460 nm under fluorescent spectroscopy and intensity values were recorded. The procedure was repeated for a 2% cyclohexane/sucrose solution. Peak emissions were compared and the cyclohexane fluidized the membrane resulting in a statistically significant reduction in intensity. To achieve a converse effect, a 20% (v/v) Cholesterol/DLPC mixture was used to produce liposomes in the presence of sucrose solution. Intensity values were compared to those of the control group for the cyclohexane experiments. The intensity values for the cholesterol group were higher than control.

The liposomes used in this experiment are a suitable model for the mammalian cell membrane in both size and physical similarities. This previously undocumented method for characterizing membrane conditions provides a qualitative method of measuring changes in membrane viscosity.