

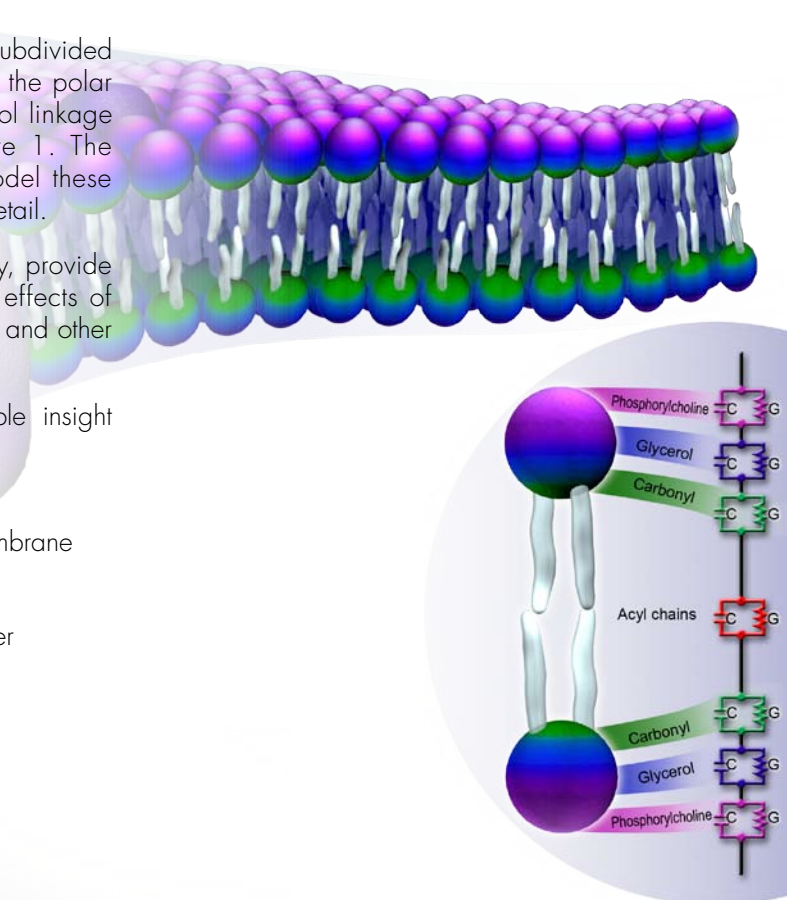
## Lipid Bilayer Membranes

Electrically a lipid bilayer membrane can be subdivided into distinct dielectric layers corresponding to the polar end group, alkyl chain, and carbonyl/glycerol linkage group of the phospholipid molecule, Figure 1. The **INPHAZE** HiRes-EIS system allows you to model these layers individually at a sub-nanometer level of detail.

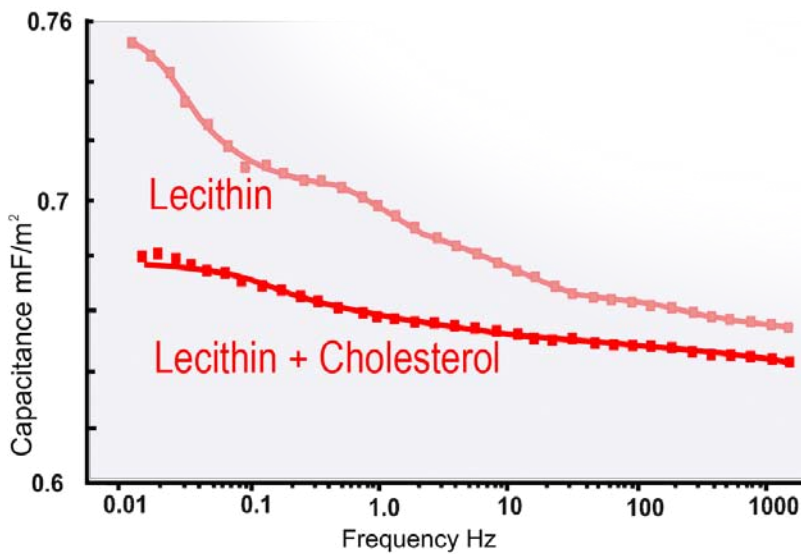
Artificial lipid bilayers, made in the laboratory, provide a vehicle for the study of channels, and the effects of lipophilic drugs, hormones, steroids, antibiotics, and other pharmaceuticals, Figures 2 and 3.

Thus the INPHAZE Spectrometer provides valuable insight into:

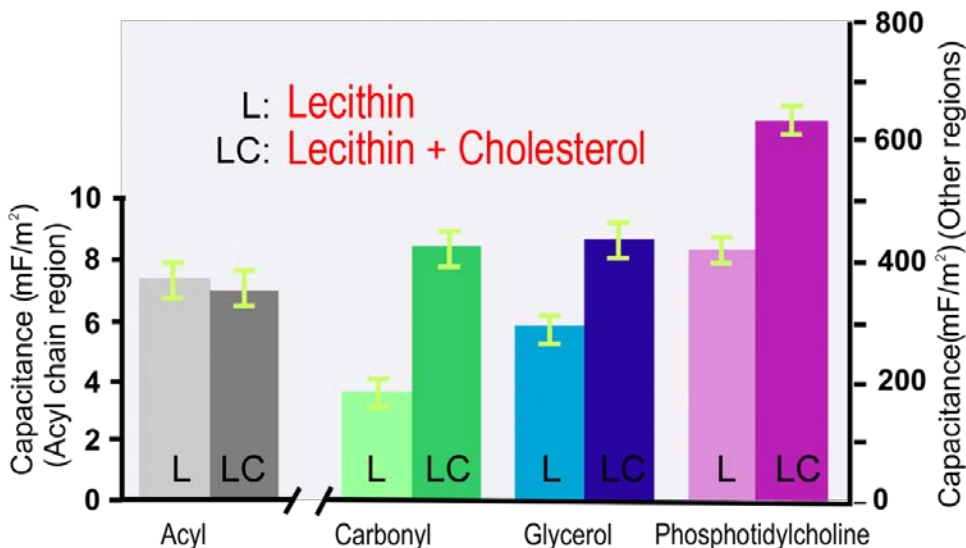
- molecular structure
- location/effects of molecules within the membrane
- electrical properties
- properties of proteins inserted into the bilayer



**Figure 1** The bilayer is modelled as a series of capacitances (C) and conductances (G).



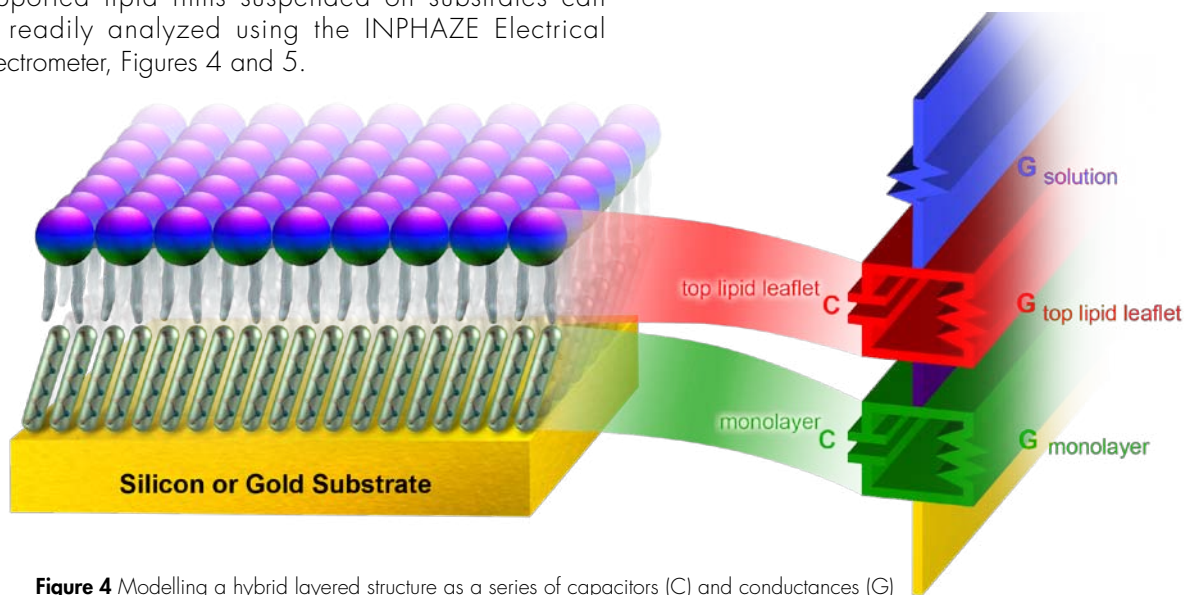
**Figure 2** Capacitance versus Frequency of a lecithin lipid bilayer before and after addition of cholesterol.



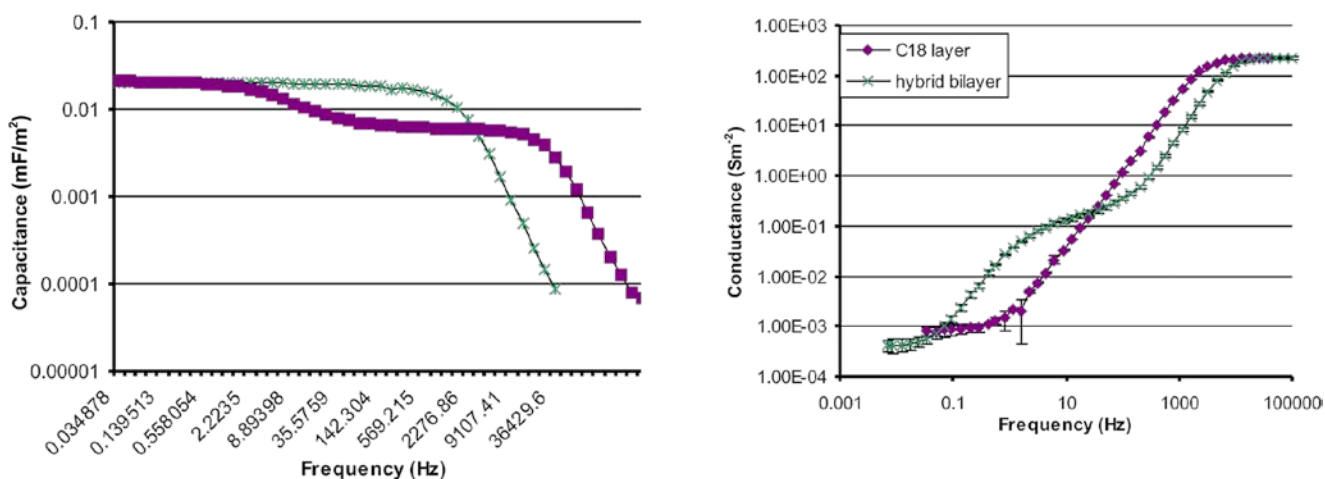
**Figure 3** Effect of cholesterol on the electrical capacitance of substructures in the phospholipid bilayer.

# Lipid Monolayers

Supported lipid films suspended on substrates can be readily analyzed using the INPHAZE Electrical Spectrometer, Figures 4 and 5.



**Figure 4** Modelling a hybrid layered structure as a series of capacitors (C) and conductances (G)



**Figure 5** Graph of Capacitance (left) and Conductance (right) as a function of Frequency. A simple C18 alkyl chain monolayer (purple) is compared with a hybrid bilayer (alkyl chain layer supporting lipid layer, green). The effect of the addition of the lipid layer is clearly seen.

## INPHAZE Key Specifications

Impedance range:	0.1 – 10 <sup>10</sup> ohm
Phase resolution:	0.001 degrees
Magnitude error:	0.002%
Frequency range:	0.001 – 10 <sup>6</sup> Hz
Configurations:	2, 3, or 4-electrode
<i>Specifications may be altered at any time. Please confirm with your vendor.</i>	



WARRANTY: INPHAZE hardware units are supported by a two year warranty

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