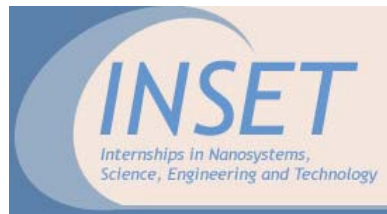


# Compositional Effects on Phase Transition Behaviors of Myelin Monolayers

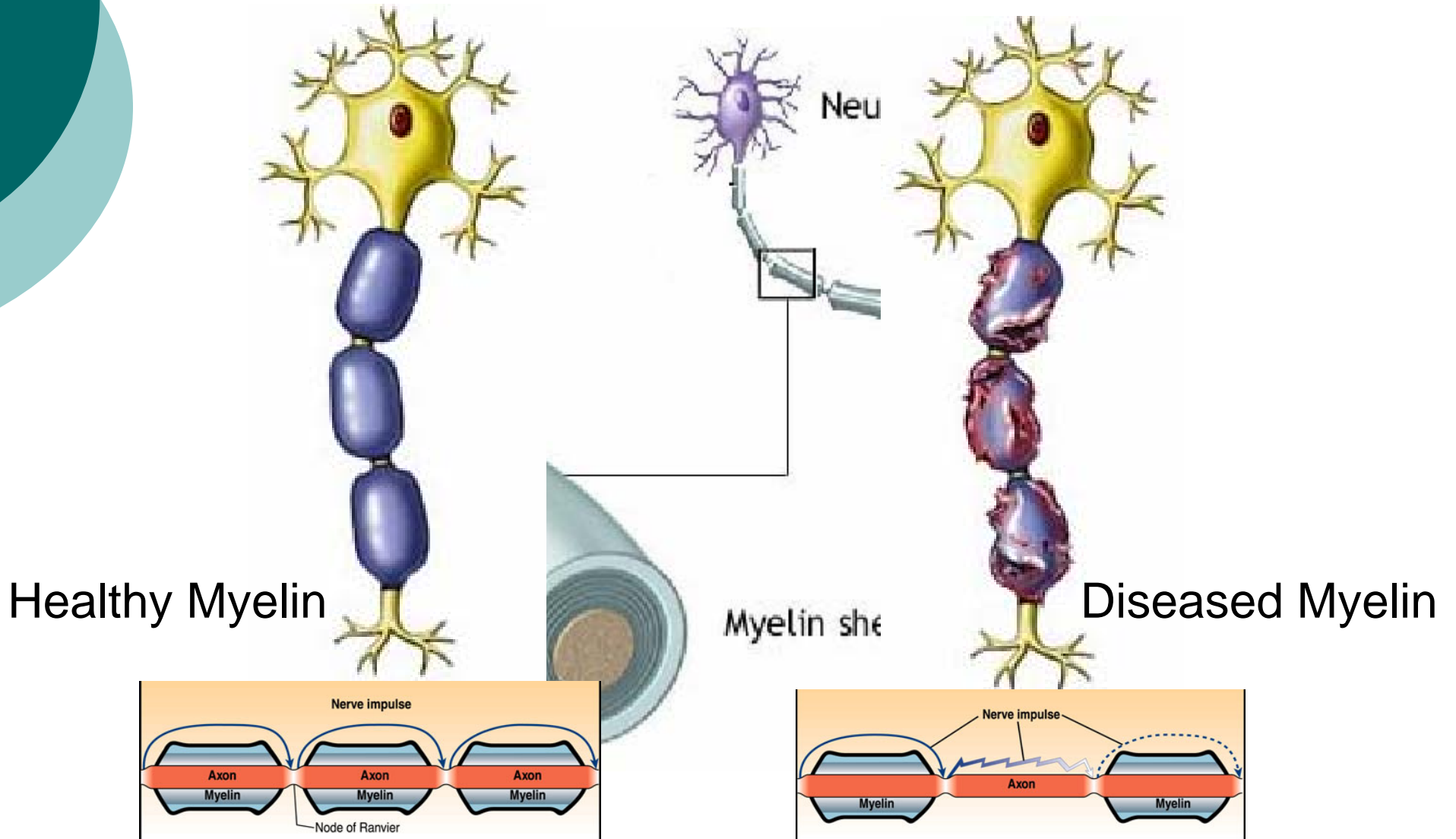
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Chemical Engineering*

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Faculty Advisor: J. Israelachvili & J. Zasadzinski  
UCSB Chemical Engineering Department



# Myelin Sheath & Multiple Sclerosis (MS)





# Research Goals

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Mechanism by which MS develops not understood therefore research will be fundamental in nature:

- Myelin composed of 7 constituents
- Pick two of those components and study the stability/instability of lipid mixtures of various mole ratios:
  - Isotherm Experiments (In Progress)
  - Confocal Microscopy (Coming Soon!!!)

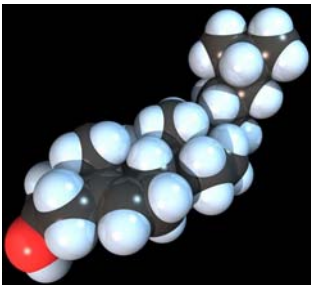
Lipids studied this Summer:

- 1) Cholesterol (CHOL), Bovine
- 2) Phosphatidylethanolamine (PE), Porcine

# Why CHOL & PE ?

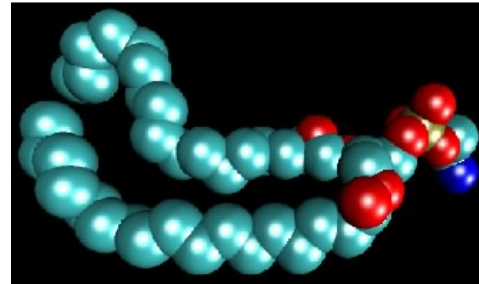
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- CHOL most abundant component
- PE known to show adhesive forces in myelin multilayer
- Ultimately **few** Research Studies done with CHOL and PE



MW 386.66

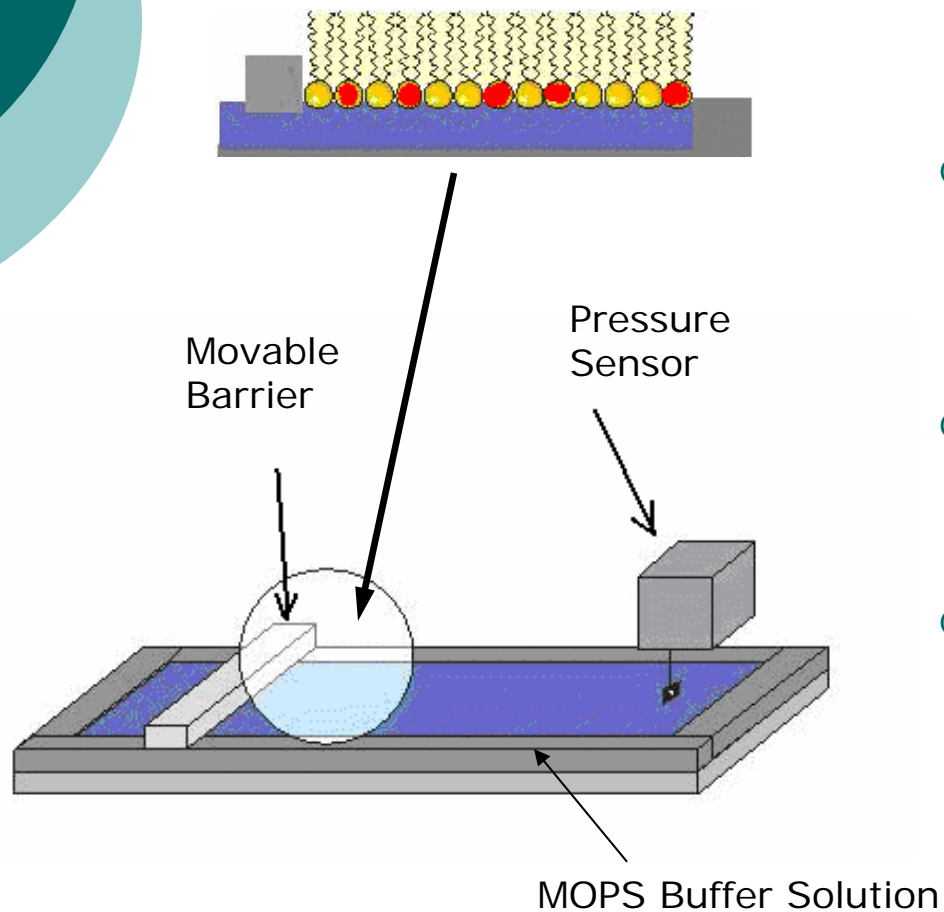
Cholesterol



MW 746.06

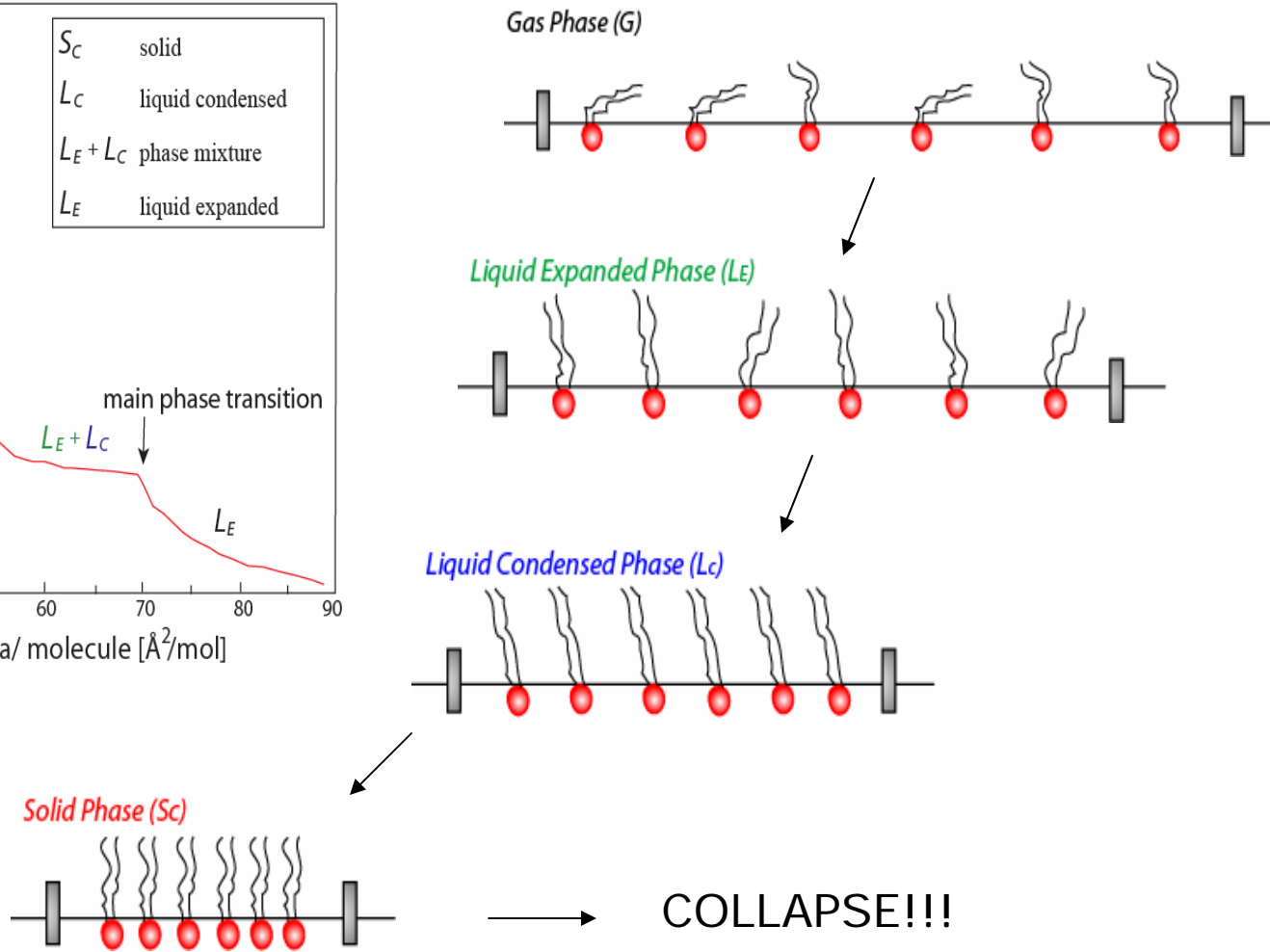
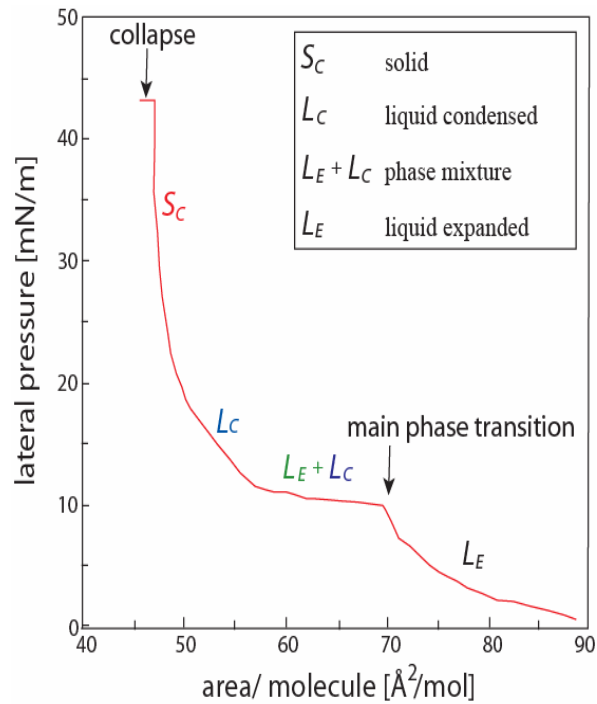
PE

# Isotherm Experiments

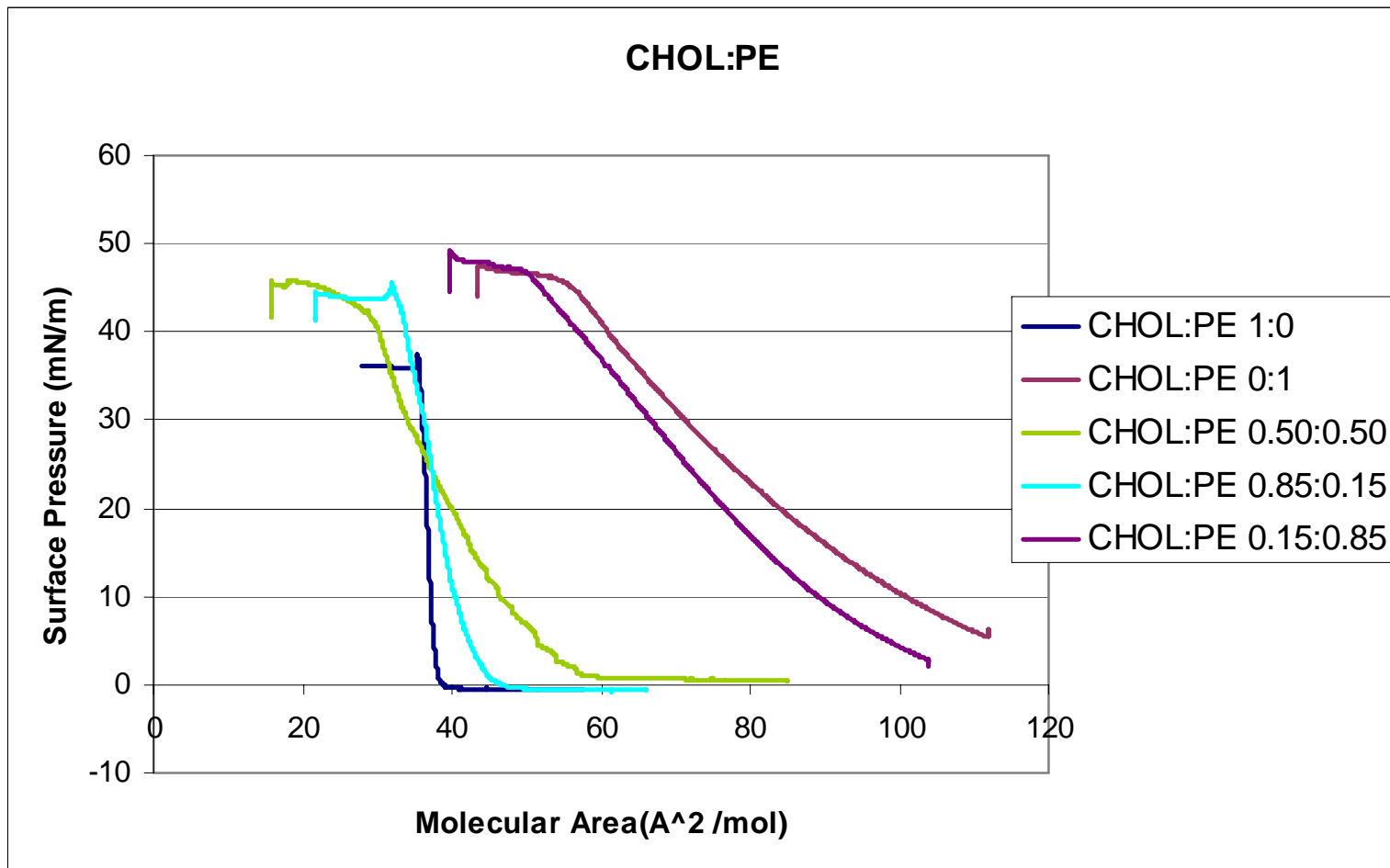


- Employs Langmuir Trough
- MOPS Buffer pH 7.2 imitates physiological environments
- Place sample... and compress
- Computer collects data

# Phase Transitions



# Data





## Data (Con't)

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- Pure CHOL collapses much quicker than pure PE
- Lipid Mixtures take on characteristics of BOTH pure lipids
- Data gives us something to compare to REAL myelin composition





# Summary of Achievements

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- Identified a lipid that potentially could reinforce integrity of myelin
- **Different** Mole Ratios than Previously Studied Tested all nine lipid mixtures
- Adds to the foundation on which we can build on.



## Future Plans

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- Conduct many isotherms to be able to compare to real myelin lipid compositions
- Different Temperatures (+/- Body Temperature)
- Confocal Microscopy



# Acknowledgements

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THANK YOU!!!