

## Biophysics 204 lectures

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### PROTEIN-PROTEIN INTERACTIONS

The class is already divided into four groups, GIBBS, PAULING, SANGER and FRANKLIN as per previous assignments for paper discussions.

I have presented discussion questions here for the four groups.

I would like the discussants to lead the class.

I expect someone from the group addressing the issues **or asking the class questions** to be standing at the board or screen.

**About Figures:** These lectures and the Discussion papers often require structure explanations. Each group should come prepared with color transparencies of the critical figures so that the class can follow the discussion.

The questions that I present here are provided to encourage discussion including background and detailed resolution about the point if appropriate.

The best answers are not single word, but thoughtful ones.

#### Discussion papers:

January 7th. The objective is to learn about experimental methods for discovering interactions between proteins and how to measure associations.

Discussion paper: **Schuster SC; Swanson RV; Alex LA; Bourret RB; Simon MI. Assembly and function of a quaternary signal transduction complex monitored by surface plasmon resonance. Nature, 1993 Sep 23, 365(6444):343-7.**

What the paper is about-

- Discuss quaternary structure of a signal transduction complex that controls chemotaxis in E. coli
- Measuring kinetics of association and dissociation of proteins in formation of complex
- Using surface plasmon resonance to derive binding constants
- Role of ATP driven phosphorylation and covalent modification in complex stability
- Role on ligand binding to receptor in promoting assembly

Assignments for discussion points

### **Gibbs**

Introduction

What are bacterial signal transduction systems, and what do they do for the cell?

What are the principal questions that this study would answer?

What molecular assembly is the ultimate target for the control system and how does it function?

Why is SPR an appropriate technique?

### **Pauling**

What are the functions of the four key proteins?

What is the functional role of phosphorylation of the protein?

What is the mechanism function of the phosphorylation?

What is the function of methylation?

### **Sanger**

Explain the results in each key sensorgram figure.

Explain each experiment.

### **Franklin**

Summarize the findings with criticism and suggestions for future work.

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