

Biochemistry Cumulative Examination
December, 2015, Total 100 points

1. Briefly describe the differences between annular and non-annular (integral or structural) lipids for membrane proteins. Also describe how tightly they bind to the membrane proteins and which roles they play? (25 points).

2. Briefly describe three biophysical methods that can be used to probe interaction of membrane proteins with lipids and discuss the main strength and weakness of each method (25 points).

3. Robinson and co-workers pioneered the mass spectrometry (MS) technique that allows determination of lipid-membrane protein interactions. Their results show that cardiolipin is important for the stability of bacterial aquaporin, AqpZ, whereas phosphatidylglycerol is essential for the stability of bacterial ammonia transporter, AmtB. Describe their main experimental strategy and biological meaning of these data. Also propose at least two additional experiments to confirm the MS data. (50 points)