

October 2011 Biochemistry Cumulative Exam
Topic: Protein Structure and Function

by Prof. Leslie Fung

1. Define the following:
 - (a) Zymogen
 - (b) Effector caspases
 - (c) Caspase-recruitment domains

2. Caspases recognize their substrates out of the diverse protein milieu of the cell on the basis of primary, secondary, tertiary, and quaternary structure.
 - (a) The absolute requirement for aspartate at the P1 position is well recognized. Is there side chain specificity for other positions? Be specific on the positions discussed.
 - (b) Discuss whether there is specificity on the substrate's secondary and on the tertiary structure. (remember to answer both parts: secondary and tertiary)

3. Discuss the many possible function effects of caspase on its substrates. Provide one example for each case.

4. Complex multi-cellular organisms must maintain a fine balance between growth and death at the cellular level. Caspases have become the center of attention in this fine balance and have impacted on human diseases that result from misregulation of apoptosis or remodeling. Give two examples to show the involvement of caspase substrates in health and disease.