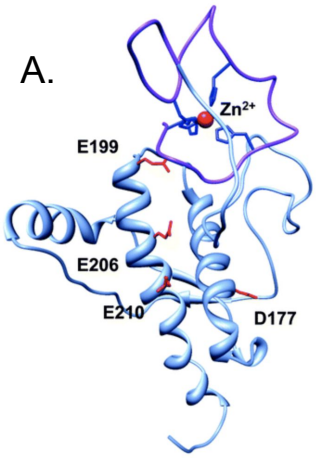
Using Models to Explain Biological Phenomena **Name**_____

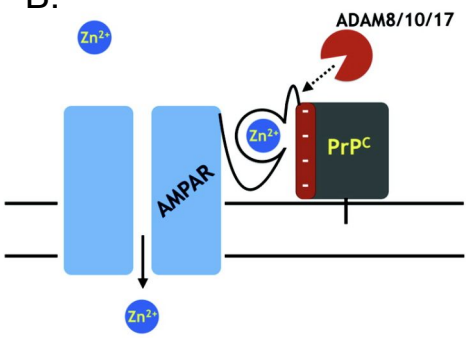
The models below (McDonald & Millhauser 2014) depict the prion protein (PrPc), a protein implicated in neurodegenerative disease. The two models help explain how the protein structure is changed by zinc, which then helps regulate zinc transport in the brain, it's proposed *normal* function. **Read the model captions below and examine the figures.**

A.



A. Model of PrPc's structure when binding zinc. Zinc is bound by amino acids in purple region, and makes contact with two of PrPc's alpha helices near a cluster of negatively charged amino acids, shown in red.

B.



B. Schematic model of PrPc structure promoted by zinc at the cell surface. PrPc's structure, when bound to zinc, allows it to interact with a cell-surface receptor, AMPAR, and regulate zinc. Enzymes such as ADAM8/10/17 turn off this zinc regulation by cleaving part of PrPc.

Scientific models are used to help us explain complex phenomena. Scientists make claims or predictions using models and justify the choice in a model by:

- Evaluating the models available based on their ability to account for key features of the phenomena they are trying to explain and understand
- Comparing available models to each other towards supporting an explanation
- Considering the short-hand, assumptions and/or limitations of models compared to the phenomena they represent.

Use the model(s) to describe a specific aspect of prion protein structure or function of interest to you, and justify your use of the model(s) using the bullets above as a guide.