***References***

Saito, H. 2010. Regulation of cross-talk in yeast MAPK signaling pathways. Saito H. Curr Opin Microbiol. 13(6):677-83.

Hohmann, S. 2009. Control of high osmolarity signalling in the yeast Saccharomyces cerevisiae. FEBS Lett., 583(24):4025-9.

***Key Terms (define and, when applicable, give an example from paper)***

* Signal transduction pathway
* phosphorylation
* MAP kinase
* Cross-talk
* Pheromone

***Questions***

1. Compare and contrast the three yeast MAPK modules (pheromone, FG, HOG) described in this paper. What are the components of these modules? How is each module activated and what is the downstream result?
2. List four general strategies overlapping MAPK modules utilize to avoid cross-talk.
3. For each strategy listed above, describe a specific example from the paper.
4. What do you predict the phenotype of a *hog1* mutant would be with respect to resistance to osmostress?
5. The paper by Hohmann emphasizes the fact that there are actually two branches of the HOG pathway that converge on the MAP kinase kinase, Pbs2. With this in mind, would you predict that a *ste11* mutant would be more or less resistant to osmostress than a *hog1* mutant? What would you predict the phenotype of the ste11 mutant would be with respect to filamentous growth?
6. Considering the crosstalk between the FG and HOG pathways, what do you predict the phenotype of a *hog1* mutant would be with respect to filamentous growth?