

Problem Set #8. Due November 21. Genomics and Yeast Questions

- Yeast Genetics.** You have identified a yeast mutant cell that cannot mate. Call it *ste#D*. It is unknown if *ste#D* had one or two mutations causing sterility. Describe your simple experiment and the expected results for the 3 situations that can determine if *ste#D* has 1 or 2 mutations, as we discussed in class. (You can consider *ste#D* a conditional mutation.)
- Recombination:** Discuss in 2-3 sentences whether meiotic recombination or mitotic recombination occurs more frequently, and why.
- Recombination.** The human chromosomes below contain two human disease genes, BAD and WORSE. The BAD and WORSE genes effect hair quality. The individuals that are b^-/B^+ and w^-/W^+ have normal hair, as do B^+/B^+ and W^+/W^+ , thus showing that each of these mutations are recessive. Only a cell that becomes homozygous for either mutation has a hair phenotype (b^-/b^- gives rise to bad hair, w^-/w^- to worse hair, and $b^-/b^- w^-/w^-$ is “worse-than-bad” hair!). Anyway...

a. Draw how a cell would become $b^-/B^+ w^-/w^-$ by crossing over during mitotic recombination. (Hint: refer to Weinert yeast lectures on mitotic recombination of the MAT locus.)

b. Given how far these genes are from the centromere and from each other (see cM scale), explain which cell is more common; $b^-/b^- w^-/w^-$; $b^-/B^+ w^-/w^-$; or $b^-/b^- w^-/W^+$. Explain briefly referring to the diagram in your answer.



