**Lab exercise. Streak plates and compare mutation rates of yeast strains.**

**Safety issues**

1. Tie your hairs behind in the lab, especially when using Bunsen burners.
2. Wear gloves when handling samples with live bacteria.

**Background**

For this exercise, you will be given two strains of *Saccharomyces cerevisiae* on plates.

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| Strain | Genotype |
| DBY1531 | Diploid, his4-539/his4-539, cry1-51/CRY1, lys2-801/LYS2, ADE2/ade2 |
| DBY1394 | Haploid, his4-539(am) ade2 |

In the genotypes, genes in upper case are wildtype ones, and those in low-case are mutant ones. The *ade2* mutant can display red pigment on YPD plates.

**Procedure**

1. Clean work space.
2. Label the bottom of the plate with strain, your names, and date.
3. Light Bunsen burner, flame a loop.
4. Touch the side of tube or culture dishes with the loop (let it cool), then dip the loop in cell cultures.
5. First streak on plat, then flame the loop.
6. Repeat the previous step at least twice, in order to generate single colonies.
7. The plate should be left upside down in the 30◦C incubator.

**Clean up**

* Turn off Bursen burner. Clean work space.

**Report (Your report should be written in WORD and submitted to WebCT).**

1. There should be many red colonies of DBY1394 on YPD plates, but there might be some yeast colonies with a fraction of white cells, and even completely white colonies. The red cells due to *ade2* mutation. Could you speculate a reason that gives rise to the white cells? Limit your answer to two sentences.
2. For DBY1531, most of the colonies should be white due to *ADE2/ade2* genotype, but there might be some red colonies. With regard to the ADE2 locus, what kind of genotype of those red cells should be, *ade2/ade2*, *ade2/ADE2*, or *ADE2/ADE2*? (Hint, this phenomenon is often called loss of heterozygosity. Be aware that the Wikipedia entry on loss of heterozygosity is literally only half-correct.)
3. Compare the frequencies of mutations in DBY1394 and DBY1531. Which one has higher mutation rate? Provide one or two reasons to explain your observations. Limit your answers to <50 words.