

## BIOINFORMATICS LAB OVERVIEW

This exercise is performed in the computer lab. Students learn basic bioinformatics techniques including reading DNA sequence and using BLAST to identify and compare DNA sequences. From their BLAST output, students will observe that some genes are highly phylogenetically conserved while others are not. Using information about the function of the genes, students will speculate as to why this is the case. A lecture about sequencing will be given prior to working in the computer lab.

### The Exercise:

Half of the class will receive a sequence file for the gene Pol30 from *Saccharomyces cerevisiae* (budding/bakers yeast). Pol30 is part of the DNA replication machinery and is conserved from yeast to humans. The other half of the class will receive a sequence file for the gene Cwp2 from *S. cerevisiae*. Cwp2 is part of the yeast cell wall and, as such, is only found in *S. cerevisiae*. Students will know neither the identity of the gene nor its organism of origin. Students will be encouraged to work together to complete a worksheet about their gene sequence (see Bioinformatics Lab – attached).

### Gene Sequence

Using EditView (Mac), students will look at the sequence output directly from the sequencing machine. They will read the sequences and answer questions about them (see Bioinformatics Lab worksheet).

### Gene Identity

Students will enter their genes into NCBI's BLAST program, which compares a given sequence to all DNA sequences in several databases. BLAST will identify the sequences as well as align them to similar sequences from other organisms. Students will write down the identity of the gene and answer several questions about the BLAST output (see worksheet).

### Gene Function

Students will search the name of their gene on the yeast genome database website. The website will give the gene's function.

### Gene Conservation

Using the BLAST output, students will determine whether or not their gene is conserved. Students will reflect on how the function of their gene relates to its conservation.