

## Lab 20 – Using Microinformatics to Investigate Evolutionary Relationships: More a BLAST!

### Introduction:

**Genome-wide** (GW) genomic studies using international consortia project genomes of the Human Genome Project, now also include and require 20,000 to 25,000 genes that define a human being. This project also systematically sequenced the genomes of other species, including the fruit fly, mouse and *Drosophila*, etc. The sequence and structure sequencing of the genomes of these different species are available for analysis and are being compared.

Why is this information important? Being able to identify the precise location and sequence of human genes and other genes across different species genomes. In addition, finding other relationships of genes in other species helps us understand evolutionary relationships among organisms. Many of our genes are identical or similar to those found in other species.

Remember your laboratory project that investigated the evolutionary distance to fruit flies. In this case, you have genomic information. Does it make a difference? It should take you nearly 40 years to walk through the entire human genome to try to locate the same sequence of bases as that in fruit flies. This technology and progress, and sophisticated technological methods is needed.

**Microinformatics** is a field that combines statistics, mathematical modeling, and computer assisted analysis biological data. Using microinformatics methods, entire genomes can be quickly compared to identify evolutionary relationships and differences. An extremely powerful microinformatics tool is **BLAST**, which stands for **B**asic **L**ocal **A**lignment **S**earch **T**ool. Using **BLAST**, you can input a gene sequence or identify a sequence of genes and discover the identity of similar sequences in a matter of minutes.

In this investigation, you will use **BLAST** to compare relationships and phylogenetic information to construct a **cladogram**, a phylogenetic tree called **evolutionary tree**, or an **evolutionary tree** representation of species. **Figure 1** below depicts a typical cladogram.

Note that the cladogram is rooted with **Archaeopteryx** and leads to birds representing a specific species. The other three taxa species are listed to show that they are evolutionarily close to each other.

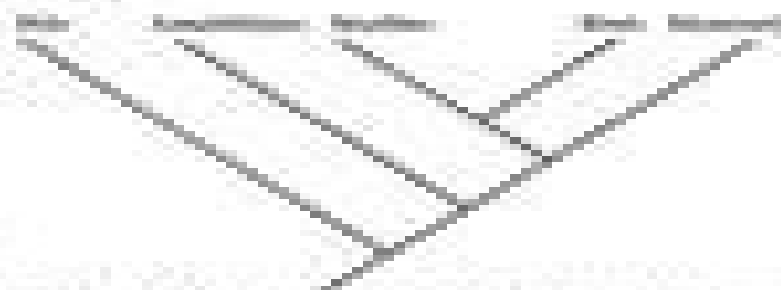


Figure 1. A simple cladogram of the Phylogeny 1 Species.

## Lab 21 Blast Answers

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Sheel**



## Lab 21 Blast Answers:

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