

"Genetic evolution happens and it might really happen along!"

Introduction:

You are the manager of a new animal feed supply company. You recently fed a wild mouse (it seems to be a combination new animal feeds designed for dogs, cats, rats, mice and guinea pigs) (based on your research on the *Gli3* gene, you utilize this information). *Physocarpus promelas* (mouse) is in these feeds. Most mammals with a mouse, non-mammals that use *Gli3* and *Gli3* are not mammals (mouse) (it is that day). The *Gli3* gene encodes an enzyme, *Lipidolactone oxidase*, involved in vitamin D synthesis. The *Gli3* gene is present in mice and most other mammals, but is either missing or non-functional in some mammals. These animals must make their own vitamin D and must have the vitamin present in their diet. The vitamin D is a hormone, including pituitary, such as humans and dogs. These animals must *Gli3*. A functional gene produces a functional protein. In this case, the *Gli3* gene, in some mammals, the *Gli3* gene is an example of a pseudogene. Pseudogenes are vestigial genes. That is, they were once functional in an ancestral species, but something (usually a large deletion) or mutation (usually a large deletion) rendered them non-functional. In many cases they are in the same place as a protein-coding gene, but they are not. Pseudogenes represent molecular fossils for evolution. As fossils are the remains of extinct organisms, pseudogenes are the remains of extinct genes.

Procedure:

The B. B. Genomics database is a set of databases called GenBank, which contains nucleotide and amino acid sequences for those genes and proteins whose sequences have been determined. For your research we will use a computer program called **BLAST**. BLAST is a program that searches the GenBank database. If you input a nucleotide or amino acid sequence into BLAST, it will search for any known protein or protein that is similar to the one that you entered. You will use BLAST to determine if the sequence of the *Gli3* gene, humans and dogs, is similar to the *Gli3* gene, or if they contain a *Gli3* gene. Pseudogenes, which is a deletion or mutation of the *Gli3* gene.

Part I: Is the *Gli3* gene present in *Physocarpus promelas*?

1. Open the Google doc: ["mouse *Gli3* gene"](#)
2. Copy the nucleotide sequence for the mouse *Gli3* gene. Copy ONLY the sequence.
3. On the Internet, go to

<https://blast.ncbi.nlm.nih.gov/Blast.cgi>

4. Click on Nucleotide BLAST.
5. Paste the mouse *Gli3* sequence into the box under "Enter Query Sequence".
6. Scroll down until you see **Choose Search Set**.

Options:

7. Click **Other**, then choose from the drop-down menu **nucleotide collection (nr)**

