CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Laura A. Negron

Project Number
S0419

Project Title
How Closely Related Are Humans to Other Species?

Abstract

Objectives/Goals
I analyzed protein sequences from different species in order to trace the similarities and differences between humans and other species. I believed that, after analyzing five different protein sequences, I would conclude that they are very close to identical and that Homo sampiens have more in common with other species than one would expect.

Methods/Materials
After searching "Myoglobin Homo sapiens" in the NCBI/Genbank, there was a list of different myglobin proteins from which to choose. I chose the protein NP_976312 and translated the sequence into the FASTA format. I then inserted the protein sequence into the NCBI/Protein-BLAST program in order to find similar proteins in other species. I chose four proteins from amongst the displayed matrix: EAW60065.1, P32428, PO2193 and 1MYHA. After translation into the FASTA format, I inserted them into CLUSTALW. To these four sequences I added my original FASTA sequence, NP_976312. ClustalW then created a multiple sequence alignment of the sequences, placing then in a column in preparation for analysis. I counted the differences in amino acids by noting changes in letters, which represent different amino acids.

Results
The multiple sequence alignment of the five different proteins reveals results contrary to my expectations. The protein EAW60065, belonging to the human species, is most similar to NP_976312. Protein 1MYHA, from Sus scrofa (wild boar), is the second most similar sequence. It is followed by PO2193 and P32428, in that order. The least similar protein belongs to the Ondatra zibethicus species. However, even the least similar protein sequence had a small percentage of amino acid differences, the sequences being 86% similar.

Conclusions/Discussion
While these results do not prove that humans are closely related to any of the tested species, it does prove that humans have things in common with the most trivial of species. Through this analysis of proteins, I have learned that many amino acids make up a single protein and each is important. My experiment partially proved my hypothesis because the sequences were very similar, but disproved my hypothesis because they were not identical. My project emphasized the purpose of amino acids within protein sequences, and displayed their influence in the resulting protein sequences.

Summary Statement
This project's goal was to see how similar humans are to other species.

Help Received