**Late Pleistocene Homo Assignment**

For years we have been able to analyze the fossils of extinct humans like those of Neanderthals.  Their bones gave us clues to how they looked, how they lived, and how they might be related to us.  In the last few years, we have been able to get a better view into these extinct species and their relationship to our species.  Thanks to next generation genomic sequencing technologies, we have been able to obtain genetic data on Neanderthals, Denisovans and others that have allowed us to make direct comparisons between our species and theirs.  In addition, we have been able to observe the presence of DNA from these extinct species within our own genomes which tell us that we had kids with these now extinct humans.

If we take Neanderthal DNA as an example, we find that we share 99.5 percent of our DNA with them.  Which means that we and Neanderthals were separated from each other for more than 500,000 years.  This also means that we were genetically similar enough to be able to have offspring with each other.  We see evidence of this genetic introgression between us and Neanderthals when we look at our DNA.  Interestingly, if we obtain one thousand DNA samples from Grossmont College students, we estimate that we would be able to extract at least 20% of the Neanderthal genome from them.  This means that 20% of our collective nucleotide sequences are shared with Neanderthals but this doesn’t mean that 20% of our genes are Neanderthal specific genes.  Of the twenty-one thousand genes that Neanderthals had, only a few dozen of their genes survive within our genome. The same holds true for Denisovans.  What is more interesting is that older versions of ourselves have a tendency to have higher levels of DNA from extinct humans compared to ourselves.  In other words, over the course of thousands of years we have been slowly weeding out the DNA of the other humans from our genome in favor of our genes.

One basic question that we might like to ask is why have we been losing Neanderthal and Denisovan genes over time? Also, why do we still have a significant amount of DNA segments that don’t seem to be going anywhere? The answer to this has to do with selection.

The answer to the first part of the question has to do with the fact that we were not fully genetically compatible with the other human species to begin with.  Basically, to have had Neanderthal or Denisovan genes in the past meant that an individual's level of fitness was reduced. To get rid of their genes in favor of our own would mean that the relative fitness of individuals would increase overtime.

The answer to the second question has to do with the fact that DNA segments from Neanderthals and Denisovans that did not code for proteins remained because there was little selective pressure against them. As far as genes are concerned, the only Neanderthal and Denisovan genes that remain only exist because they had a selective advantage or at least have been neutral to our species.

DNA segments that that were neutral or that had a selective advantage, whether genes or not,  simply remained because they were advantages or there was little selective pressure against them.

Your task for this week is to look for information about one Neanderthal or Denisovan gene that survive within our species and to tell me what function that gene has and how that gene may increase the fitness of modern human populations.

* In your post, discuss**ONE**Neanderthal or Denisovan gene that is currently found within our species.
  + Tell us about the gene and its function.  Explain what it does for us. (Make sure you give a citation.)
  + Explain in your own words any possible advantages that your Neanderthal or Denisovan gene might have. Make sure you give in informed opinion that is grounded in your research.