Chasity Chambers

Introduction to Bioinformatics and Genomics

BINF-1101-001

December 7, 2022

Forensics and Sequencing

Bioinformatics and genomics play a huge role in forensics and sequencing. With times continuing to advance, forensics and sequencing has developed into two of the most well-known developments in biotechnology all thanks to bioinformatics and genomics. We refer to these developments as DNA fingerprinting (forensics) and Sagner sequencing. In connection to these subjects, we must first begin with the understanding of gel electrophoresis. Gel electrophoresis is a very interesting process that separates fragments of DNA in reference to their size. Parts of DNA that is used for DNA fingerprinting is STRs or short tandem repeats, which are repeated multiple times. It is important to note that gel electrophoresis has now been mostly replaced by capillary electrophoresis. Beginning with forensics or DNA fingerprinting, gel electrophoresis separates the markers to make this process possible. In contrast, capillary electrophoresis is used in Sagner sequencing. This makes the use of different color dyes important in identifying each dideoxy nucleotide.

In all we can use these biotechnological processes to determine paternity tests, immigration, finding a suspect for a crime, or contributing to the Human Genome Project. The most interesting part of this topic to me, is the aspect of potentially being able to find a culprit for a crime or unintentionally convicting an innocent person. This is mostly in DNA fingerprinting with CODIS where, many errors could occur, and a suspect may be innocent. One error could be that a trace of DNA was already at the crime scene before the crime was committed. A secondary transfer could have placed DNA at the crime scene pointing to an innocent suspect. Heterogeneous rates of DNA shedding between the true perpetrator and someone unrelated, associated with the crime scene is another possibility. The most interesting of all though, is contamination in a forensics lab that would place DNA at a crime scene. These all suggest that with more time and technology some of these could possibly be errors that can be detected beforehand.

This topic is very relevant to today as crime rates continue to rise. Overall, this topic applies to many aspects of life outside of justice. When determining paternity and immigration, this topic can also be applied to today and the future. Most importantly, the Human Genome Project being contributed to by these processes, is very relevant to the future. I believe as time progresses, we will be able to use the technology from these processes, to further develop other biotechnology to help better our day-to-day life.