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Prior to the creation of the Human Genome Project there was some lack of technology in the field of molecular biology that prevented the undertaking of such an effort. The advancements that enabled the project were gene mapping and DNA sequencing. The development of the gene-mapping process involving lengths of fragments came from Dr. Mark Skolnick from the University of Utah. He was searching for the location of the breast cancer gene in 1974. Additionally, Fredrick Sanger's breakthrough in DNA sequencing in 1977 allowed for the large-scale human genome effort later on. The Sanger sequencing method involves the termination of chains in various lengths and then organizing them into bands using electrophoresis based on the sizes of the fragments.

Early Insights

The first rough draft of the human genome was created by the genome bioinformatics group at the University of California, Santa Cruz. In doing so there were some surprising discoveries. Humans have only around 25,000 genes which is much less than some more simple organisms. This made it clear that the complexity of an organism is not tied the number of genes that it has. Also, in addition to this, while we may have less genes than expected, they are still very complex and versatile in nature. Numerous genes discovered are believed to be responsible for several functions in the human body and are expressed in various different tissues and organs.

Important Improvements

In 2003, The Human Genome Project resulted in an improvement from the original draft where 92% if the genes were accounted for and there was less than 400 gaps. In 2006, there was another milestone where the sequence of the very last human chromosome was published. And lastly, in 2008, the technology of RNA-seq was introduced, where scientists could directly sequence the messenger RNA within cells. This method replaced the previous methods because it was more accurate due to direct measurement.

Industries created due to HGP

This is where things get the most interesting because the Human Genome project has a lot more lasting impacts beyond just understanding our genetic code. A lot of private and government entities today rely on mapping genes and sequencing DNA . Forensics, for example, and the investigation of crimes involves a lot of work with DNA, and justice has been brought to many unsolved cold cases of the past as a result of these advancements. On the other hand, private companies such as 23andMe and Ancestry.com rely on genes and DNA to provide customers with information regarding their lineage and predisposition for various diseases.