

## Writing Diagnostic

The intent of this paper is to provide a summary of the topics discussed in the TED Talk video *'What can DNA tests really tell us about our ancestry?'* presented by Prosanta Chakrabarty. Topics include a general overview of how DNA is shared and transferred between generations, how shared DNA is affected by a process called recombination, and how some practices of companies that offer test kits for DNA acquisition to be analyzed may not be able to provide an entirely accurate report of ancestry.

Before considering how accurately a DNA analysis can determine ancestry it helps to generally understand how one acquires their DNA. Although each human contains an incredibly large amount of DNA, 99% of it is shared with all other humans. This leaves about 1% of each individual's DNA to be unique to them. Of this 1%, only a small portion of that is captured with a test kit and is analyzed.

To complicate things even further, this 1% may not fully represent one's ancestry when considering the process of recombination. Traditionally, each human cell is made up of 23 pairs of chromosomes for a total of 46 individual chromosomes. Each pair contains a chromosome from each of their parents. However, when a sex cell is made, such as an egg by a female and a sperm by a male, it only contains 23 chromosomes which were derived from the parent's original 46 chromosomes. When this sex cell is made, only some parts from each chromosome in a pair is used. This means that a significant amount of DNA from one's parents and their ancestry is lost to them before they are conceived. This process is known as recombination and is what results in each generation not having an exact split of DNA from their ancestors. For example, one cannot say that exactly one-fourth of their DNA was derived from each of their grandparents. The further you go back in this generational chain, the more likely it is like DNA from a distant ancestor is lost entirely. Recombination can also be responsible for differences in acquired DNA even among siblings.

In addition to the complexity of how DNA is shared, some practices of these companies also contribute to their reports being inaccurate. To determine ancestry, DNA samples are compared with previous samples to find similar 'markers' identifying correlation with descending regions or race. The concern is that it is estimated that 80%-90% of samples in their database are based on European descent and exclude many indigenous people. This also means that as they acquire more samples, a test from the same person may have different.

Put simply, the process of sharing DNA from generation to generation is very complex. Coupling this complexity with limited-scoped practices are likely to create biased results. Even if not entirely inaccurate, these results are unlikely to give a complete account of ancestry.