Ethnicity Explained: Percentages, Discrepancies, Updates, and More

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Basics of Inheritance

- **Genetic Inheritance**
  - Humans have 23 pairs of chromosomes, 22 of which are autosomes and 1 pair of sex chromosomes. The autosomes control characteristics of all our traits other than those linked to sex, which are found on the sex chromosomes. The general test that DNA testing companies offer is an autosomal DNA test.
  - Genes are located on each chromosome. Genes specify certain traits such as height, eye color, or blood type. Everyone has two variations of each gene, called alleles. Each parent passes on one of their alleles, so their child also has two alleles.
- **Recombination**
  - Recombination occurs during sexual reproduction. In sexual reproduction, the DNA from two parents is combined. Each paternal chromosome lines up with the matching maternal chromosome. The chromosomes then replicate to form sister chromatids. In Meiosis I, sister chromatids cross over and exchange alleles to create genetic diversity. The maternal sister chromatid and paternal sister chromatid then separate into different cells. In Meiosis II, the sister chromatids separate into four daughter cells. Each of the final four daughter cells ends up with unique chromosomes with alleles from both parents.
  - Recombination allows for genetic variation. Siblings inherit 50% of DNA from their mom and 50% of DNA from their dad, but each sibling will inherit a random combination of alleles from each parent.

How Ethnicity Is Decided

- **Reference Populations**
  - Testing companies create reference populations by testing people with long family histories in certain parts of the world. Because individuals in these populations have been marrying others in their population and living in the same area of the world for many years, they will have detectable patterns in their DNA unique to their population.
  - Your DNA is split into small sections and is compared to the reference samples. Each portion of your DNA is assigned to the ethnicity or region it best matches, which allows the testing companies to give you a percentage estimate.
- **DNA Test Updates**
  - As the testing companies get more data and as scientific processes advance, you can expect your results to be updated periodically. Your DNA results are an estimate, so

percentages and regions listed can change as more people are tested and the estimates improve.

Common Questions

- **Unexpected Country**
    - Maps and borders have changed over time. Slovakia's borders and rulers have changed often over the past 100 years, for example. Because of border changes, wars, and migration of people, it can be hard to assign your DNA to a specific country. Your DNA results highlight genetically similar populations which do not always reflect current country boundaries.
    - Certain regions may not be available to which your DNA can be assigned. Because some populations have very similar DNA, the testing companies have decided to do more research to differentiate between populations before creating separate regions. If you believe you have ancestry from an area for which a region does not yet exist, your DNA will be assigned to a neighboring region with similar DNA. Once the testing companies get more data to create that region, your DNA will be updated to reflect the addition of the new region.
- **Differing Results Among Siblings**
    - Because of genetic variation, siblings will have differing results. Siblings inherit 50% of their DNA from each parent, but they inherit a different 50% from each parent due to recombination. Although each sibling inherits 50% of their DNA from each parent, they don't always inherit an exact 25% of DNA from each grandparent. One sibling may inherit 28% from their maternal grandma and only 22% from their maternal grandpa. Another sibling could have inherited more DNA from the maternal grandpa than the maternal grandma.
    - DNA testing is only useful about 6 generations back. Because recombination occurs each generation, there is a higher likelihood that someone would not inherit any DNA from ancestors further than 6 generations back.
    - One sibling may have inherited DNA from a distant ancestor and the other sibling may have inherited no DNA from that same ancestor. This can lead to a region showing up in one sibling's DNA results and not in the other sibling's results. This is normal.
- **Small Percentages**
    - When testing companies are comparing your DNA to reference populations, they may think your DNA best matches a certain population. As the testing companies get more data, they may change which region they think your DNA best matches. So, don't get too attached to the small percentages on your DNA results if you don't know of ancestry from that region. DNA results are an estimate and are meant to supplement the family history research you do. Please be cognizant of claiming that you are part of an ethnic or cultural community based on your DNA results alone.