

Basic Explanation of How DNA Testing Works and Why It Isn't Always Feasible

How DNA Testing Works

DNA testing is a scientific process used to analyze genetic material to identify individuals, confirm biological relationships, or gather forensic evidence. The process involves several key steps:

1. **Sample Collection** – DNA can be collected from various sources, such as blood, saliva, hair, bones, or skin cells.
 2. **DNA Extraction** – The DNA is separated from other cellular material in the sample.
 3. **Amplification (PCR)** – Polymerase Chain Reaction (PCR) is used to make multiple copies of the DNA to ensure there is enough material for testing.
 4. **Sequencing or Profiling** – The DNA sequence is analyzed, often focusing on specific markers (short tandem repeats or SNPs) that help distinguish individuals.
 5. **Comparison and Interpretation** – The DNA profile is compared against known samples (such as family members or databases) to determine relationships or identities.
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Why DNA Testing Isn't Always Feasible

Despite its accuracy, DNA testing is not always possible or reliable due to several challenges:

1. **Degraded or Insufficient DNA** – In cases involving old or buried remains, DNA may be too degraded to extract useful information. Environmental conditions like heat, moisture, and soil composition can break down DNA over time.
 2. **Contamination Risks** – If a sample is contaminated by modern DNA (from handlers or the surrounding environment), it can affect the accuracy of results.
 3. **Lack of Reference Samples** – DNA testing requires comparison samples (from family members or historical records). Without these, identification is difficult.
 4. **Cost and Resources** – DNA testing, especially forensic or ancient DNA analysis, can be expensive and require specialized laboratories.
 5. **Ethical and Cultural Concerns** – Some communities or families may be uncomfortable with DNA testing due to cultural beliefs about handling human remains.
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DNA sampling in the case of residential school searches is difficult for several reasons:

1. **Degradation of Remains** – Many of the remains being searched for are decades old, meaning DNA has likely deteriorated due to environmental conditions like moisture, soil

acidity, and temperature changes. This makes it harder to extract usable genetic material.

2. **Lack of Reference DNA** – Even if DNA is recovered, it needs to be compared to samples from living relatives. Many Indigenous families have experienced displacement, adoption, and loss of records due to systemic government policies, making it challenging to identify potential matches.
3. **Unmarked and Mass Graves** – If remains are found in unmarked or mass graves, separating individual samples and linking them to specific families can be difficult, especially if there is limited historical documentation.
4. **Cultural and Ethical Considerations** – Some Indigenous communities have concerns about disturbing burial sites due to spiritual and cultural beliefs. There must be a careful balance between forensic investigation and respecting these traditions.
5. **Lack of Official Records** – Many residential schools had poor or incomplete records of deaths and burials. Without names, dates, or documented burial locations, connecting DNA results to specific individuals is even harder.
6. **Cost and Technical Challenges** – DNA analysis, especially for degraded samples, is expensive and requires specialized technology. Many communities may not have the funding or technical support needed for comprehensive testing.
7. **Community Consent and Trauma** – The process of DNA sampling and identification can be deeply traumatic for survivors and families. Many communities may need time and support to decide how they want to proceed with searches and whether they want DNA analysis at all.

In summary, while DNA testing is a powerful tool, its success depends on **sample quality, available comparisons, and ethical considerations**, making it not always feasible in certain cases.

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