

# Scientific Foundations of Genealogy

Genealogy · Answer Key · 10 Questions

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**1. Which specific human chromosome is utilized to trace the patrilineal ancestry through unbroken male-to-male inheritance?**

- A) Autosome 21
- B) X Chromosome
- C) Y Chromosome**
- D) Mitochondrial DNA

**2. In genetic genealogy, what is the term for the process where homologous chromosomes swap segments during meiosis, potentially obscuring ancestral DNA segments?**

- A) Recombination**
- B) Translocation
- C) Nondisjunction
- D) Deletion

**3. What is the approximate rate of mutation (per generation) for Y-chromosome Short Tandem Repeats (STRs) used in forensic and genealogical matching?**

- A) 1 in 10,000
- B) 1 in 500**
- C) 1 in 20
- D) 1 in 100,000

**4. Which form of DNA is inherited exclusively from the maternal line and is characterized by a high mutation rate in the hypervariable region?**

- A) Nuclear DNA
- B) Mitochondrial DNA**
- C) Ribosomal DNA
- D) Chloroplast DNA

**5. What statistical measurement in centimorgans (cM) denotes the total length of shared DNA segments between two individuals, used to estimate their biological relationship?**

- A) LOD Score
- B) Identity by Descent (IBD)**
- C) Hardy-Weinberg Equilibrium
- D) Linkage Disequilibrium

**6. Why are autosomal DNA tests generally limited to predicting relationships accurately only up to the fifth or sixth cousin level?**

- A) The X chromosome is too small
- B) DNA segments become too short and fragmented to distinguish from background noise**
- C) Mitochondrial DNA interference
- D) Y-chromosome drift

**7. What is the phenomenon known as 'pedigree collapse' in genealogical research?**

- A) The total loss of historical records
- B) When ancestors appear in more than one lineage, reducing the number of unique ancestors**
- C) The extinction of a specific surname line
- D) The rapid degradation of ancient DNA samples

**8. Which genetic marker is used to identify specific haplogroups, representing ancient population migrations?**

- A) Single Nucleotide Polymorphisms (SNPs)**
- B) Introns
- C) Exons
- D) Epigenetic methylation

**9. The concept of 'genetic entropy' in genealogy refers to which biological reality?**

- A) The accumulation of deleterious mutations over many generations**
- B) The loss of surname information
- C) The inability to track ancestors past 500 years
- D) The bias in historical record keeping

**10. Which type of inheritance pattern do the 22 pairs of non-sex chromosomes follow in genealogical DNA testing?**

- A) Uniparental
- B) Autosomal**
- C) Mitochondrial
- D) Holandric