

Scientific Foundations of Genealogy

Genealogy · Practice Test · 12 Questions

1. Which specific mitochondrial DNA (mtDNA) haplogroup is considered the most common root for the 'Mitochondrial Eve' lineage in anatomically modern humans?

- A) Haplogroup L0
- B) Haplogroup R0
- C) Haplogroup J
- D) Haplogroup U

2. In autosomal DNA testing, what is the maximum number of centimorgans (cM) typically shared between a full sibling pair?

- A) 1500 cM
- B) 2600 cM
- C) 3400 cM
- D) 4200 cM

3. The 'Great Filter' in Y-chromosome diversity refers to a demographic bottleneck that occurred approximately 5,000-7,000 years ago. Which event is most strongly correlated with this genetic signal?

- A) The rise of pastoralist hierarchies
- B) The Neolithic Revolution
- C) The widespread adoption of bronze metallurgy
- D) The expansion of the Silk Road

4. Which form of genetic inheritance is utilized to track the direct paternal lineage through successive generations?

- A) X-chromosome transmission
- B) Autosomal recombination
- C) Y-chromosome STR markers
- D) Mitochondrial DNA sequencing

5. What is the term for a segment of DNA that is identical in two individuals because it was inherited from a single common ancestor without any intervening recombination?

- A) Identical by State (IBS)
- B) Identical by Descent (IBD)
- C) Single Nucleotide Polymorphism (SNP)
- D) Copy Number Variant (CNV)

6. In the context of genealogical dating, what is the average mutation rate of the Y-chromosome per generation for stable markers?

- A) 1 in 500
- B) 1 in 1000
- C) 1 in 50
- D) 1 in 250

7. Which of the following describes the 'founder effect' in genetic genealogy?

- A) The survival of the fittest in small isolated populations
- B) Loss of genetic variation that occurs when a new population is established by a very small number of individuals
- C) The accumulation of mutations due to environmental radiation
- D) The deliberate breeding of specific lineages for hereditary titles

8. What is the scientific significance of 'runs of homozygosity' (ROH) in a person's autosomal genome?

- A) They indicate high levels of endogamy or consanguinity
- B) They denote recent migration from sub-Saharan Africa
- C) They identify the specific HLA alleles for disease resistance
- D) They suggest a lack of X-chromosome inactivation

9. Which statistical model is most commonly employed to estimate the time to the most recent common ancestor (TMRCA)?

- A) Bayesian phylogenetic inference
- B) Linear regression analysis
- C) K-means clustering
- D) Principal component analysis

10. Approximately what percentage of a person's autosomal DNA is typically shared with a second cousin?

- A) 12.5%
- B) 6.25%
- C) 3.125%
- D) 1.56%

11. What does the 'Admixture' analysis in genetic genealogy primarily measure?

- A) The proportion of ancestral components from distinct population groups
- B) The total number of mutations in the germline
- C) The level of mitochondrial mutation accumulation
- D) The physical traits inherited from maternal ancestors

12. Why are 'phased' DNA results more useful for genealogical research than unphased results?

- A) They allow the separation of paternal and maternal alleles
- B) They increase the total count of SNPs detected
- C) They eliminate the need for reference populations
- D) They simplify the calculation of mitochondrial haplogroups