

# Genetic Factors in Cancer Development

Genetics · Practice Test · 25 Questions

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**1. Which gene is an example of a DNA repair gene involved in detecting DNA damage and has an important role in cell cycle progression?**

- A) BRCA1
- B) p53
- C) ATM
- D) APC

**2. Multiple double-stranded DNA breaks can lead to high rates of what?**

- A) Cell cycle arrest
- B) Chromosomal rearrangements
- C) Apoptosis
- D) DNA replication

**3. The syndrome of ataxia-telangiectasia is associated with progressive cerebellar ataxia and a high incidence of what?**

- A) Cardiovascular diseases
- B) Autoimmune disorders
- C) Malignancies
- D) Neurological disorders

**4. Genes that confer a high probability of susceptibility to specific cancers are usually:**

- A) Recessive and low penetrant
- B) Dominantly inherited and highly penetrant
- C) Autosomal recessive and low penetrant
- D) X-linked and low penetrant

**5. Mutations in which genes account for the majority of hereditary breast carcinomas?**

- A) RB1 and APC
- B) ATM and p53
- C) BRCA1/2
- D) Ras

**6. What is the estimated lifetime risk of breast carcinoma for carriers of BRCA1/2 mutations?**

- A) 10-20%
- B) 25-40%
- C) 55-85%
- D) 90-100%

**7. The RB1 gene, located on chromosome 13, encodes a nuclear protein that acts as a:**

- A) Proto-oncogene
- B) DNA repair gene
- C) Growth factor
- D) Tumor suppressor

**8. Inactivation of both alleles of the RB1 gene causes which condition?**

- A) Familial adenomatous polyposis
- B) Retinoblastoma
- C) Li-Fraumeni syndrome
- D) Ataxia-telangiectasia

**9. Mutations in the APC gene are associated with which condition, characterized by numerous colonic adenomas?**

- A) Retinoblastoma
- B) Li-Fraumeni syndrome
- C) Familial adenomatous polyposis (FAP)
- D) Ataxia-telangiectasia

**10. Tumour viruses expressing genes that disrupt the activity of tumor suppressor genes are an example of genes with modest effects that may interact with what?**

- A) Genetic mutations
- B) Environmental factors
- C) Epigenetic modifications
- D) Post-translational modifications

**11. Genetic (somatic) mutations caused by recognizable carcinogens can lead to which type of cancers?**

- A) Hereditary cancers
- B) Sporadic cancers
- C) Syndromic cancers
- D) Monoclonal cancers

**12. Which of the following is listed as an exogenous carcinogen that can cause somatic mutations?**

- A) Tumor suppressor genes
- B) Growth factors
- C) Aromatic hydrocarbons
- D) Proto-oncogenes

**13. The science of EPIGENETICS has established that other modifications can occur in the genetic code that influence:**

- A) Protein structure
- B) Gene expression
- C) DNA replication
- D) Cellular signal transduction

**14. Most cancers are thought to arise as monoclonal, meaning they originate from:**

- A) Multiple cells accumulating mutations
- B) A single cell accumulating mutations
- C) Viral infection
- D) Environmental exposure

**15. Genes whose function is lost during carcinogenesis are classified as:**

- A) Proto-oncogenes
- B) DNA repair genes
- C) Tumor suppressor genes
- D) Oncogenes

**16. Tumor suppressor genes can be classified as recessive because:**

- A) Mutation in one allele is sufficient for loss of function
- B) Both allele copies must be inactivated for complete loss of function
- C) They are always inherited
- D) They promote cell proliferation

**17. Functional mutations in tumor suppressor genes result in the loss of what?**

- A) Cell proliferation mechanisms
- B) DNA repair mechanisms
- C) Growth inhibitory mechanisms
- D) Signal transduction pathways

**18. The p53 gene is an example of a:**

- A) Proto-oncogene
- B) DNA repair gene
- C) Tumor suppressor gene
- D) Oncogene

**19. Approximately what percentage of human cancers possess p53 mutations?**

- A) 10-20%
- B) 25-30%
- C) 50%
- D) 75-80%

**20. Proto-oncogenes are genes whose function becomes what in carcinogenesis?**

- A) Lost
- B) Inactivated
- C) Enhanced
- D) Repressed

**21. Proto-oncogenes typically encode for proteins involved in:**

- A) DNA repair
- B) Cell cycle arrest
- C) Controlling cell proliferation
- D) Detecting DNA damage

**22. Mutations in proto-oncogenes are dominant at the cellular level because:**

- A) Both alleles must be mutated
- B) Mutation in only one allele is needed
- C) They are always recessive
- D) They are always inherited

**23. The Ras gene is an example of a:**

- A) Tumor suppressor gene
- B) DNA repair gene
- C) Proto-oncogene
- D) Oncogene

**24. Mutated Ras products remain in what state, even without appropriate growth factor receptor signals?**

- A) Inactive
- B) Repressed
- C) Activated
- D) Degraded

**25. Mutations in Ras are implicated in approximately what percentage of all cancers?**

- A) 5-10%
- B) 15-20%
- C) 30%
- D) 50%