

Grassroots Academy  
New Delhi

---

**NET JRF TEST 10**

[www.grassrootsacademy.in](http://www.grassrootsacademy.in)

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

## TEST-10

**Cancer: Genetic rearrangements in progenitor cells, oncogenes, tumor suppressor genes, Cancer and the cell cycle, virus-induced cancer, metastasis, interaction of cancer cells with normal cells, Apoptosis, therapeutic interventions of uncontrolled cell growth.**

---

1. Proto-oncogenes may be activated due to?

- (a) all
- (b) insertion
- (c) translocation
- (d) amplification
- (e) NONE

2. P-APC protein was discovered through the study of?

- (a) retrovirus
- (b) E.coli
- (c) adenomatous polyposis coli
- (d) adenovirus
- (e) none

3. Reticuloendotheliosis virus has ----- as its host species?

- (a) mouse
- (b) chicken
- (c) rat
- (d) turkey
- (e) cat

4. Wilms tumor is caused due to the deficiency at chromosomal location?

- (a) 17q21
- (b) 11p13
- (c) 11q24
- (d) 13q14.3
- (e) 5p13.2

5. Oncogenes which encode proteins that bind GTP, much like the cellular G proteins which are important in regulating the level of cyclic AMP?

- (a) sis
- (b) v-src
- (c) yes
- (d) rel
- (e) raf

6. Tumor inducing viruses have a genome composed of?

- (a) PDGF
- (b) RNA
- (c) DNA

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

- (d) Tumor suppressor genes
- (e) Oncogenes

7. Among the RNA genome genes of retroviruses which gene will encode the capsid protein of the virion?

- (a) CDKs
- (b) gag
- (c) pol
- (d) env
- (e) all

8. Metastasis takes place in only----- type of tumors?

- (a) suppressor cells
- (b) Benign tumor
- (c) malignant tumor
- (d) Progenitor cells
- (e) hybrid tumors

9. The most common type of cancer in males is ?

- (a) brain cancer
- (b) prostate gland cancer
- (c) breast cancer
- (d) lung cancer
- (e) all

10. Non defective viruses which leads to induction of leukemia

- (a) both 1&2
- (b) FeLV(feline leukemia virus)
- (c) MMTV(mouse mammary tumor virus)
- (d) Epstein -barr
- (e) all

11. When the cells do not invade to the surrounding tissues then that type of tumor is known as?

- (a) progenitor cells
- (b) malignant
- (c) benign
- (d) oncogenic
- (e) none

12. Which of the following reasons can put a break in cyclin/CDKs Complex formation during cell cycle?

- (a) all
- (b) low nutrients
- (c) DNA damage
- (d) interpreted chemical signals
- (e) none

13. Ataxia telangiectasia syndrome is caused due to aberration in the chromosomal location?

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

- (a) 15q26.1
- (b) 11q22
- (c) 3p25
- (d) 11p13
- (e) 17q21

14. Two proteins which regulate and operate each checkpoints are?

- (a) both 1&2
- (b) cyclins
- (c) cyclin-dependent kinases
- (d) cyclin-dependent hydroxylases
- (e) both1&3

15. P53 is a?

- (a) dimer
- (b) pentamer
- (c) tetramer
- (d) monomer
- (e) all

16. When the cyclins are absent ----- will be inactive?

- (a) DNA
- (b) CDKs
- (c) oncogenes
- (d) proto oncogenes
- (e) all

17. Unregulated cell division in cancerous cells is due to?

- (a) abnormal chromosomal count
- (b) cells donot respond to chemical signals
- (c) have disorganized cytoskeleton
- (d) intracellular abnormalities
- (e) all

18. Epstein-Bars a human herpes virus associated with the disease?

- (a) all
- (b) mononucleosis
- (c) nasopharyngeal carcinoma
- (d) burkitt lymphoma
- (e) none

19. Involvement of p53 protein in human cancer was studied in?

- (a) breast cancer
- (b) hereditary nonpolyposis colorectal cancer(HNPCC)
- (c) ADENOMATOUS POLYPOSIS
- (d) FAD
- (e) retinoblastoma

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

20. Bloom's syndrome is caused due to defect in the gene?
- (a) ATM
  - (b) NF2
  - (c) NF1
  - (d) BLM
  - (e) VHL
21. Who first discussed metastasis as seed and soil theory?
- (a) Snell&david
  - (b) Stephen Paget
  - (c) Froot knoop
  - (d) Robert weinberg
  - (e) all
22. The coding sequence of c-onc (normal cellular oncogenes) and c-src(sarcoma oncogenes) differ in how many nucleotides?
- (a) 31
  - (b) 24
  - (c) 12
  - (d) 18
  - (e) 10
23. Which of the following molecular activity was performed by P53 ?
- (a) oligomerizes the required c-terminal regions
  - (b) activates transcription at promoters levels
  - (c) recognizes an interrupted palindromic 10bp motif
  - (d) binds to the damaged DNA
  - (e) all
24. The body resists metastasis by a variety of mechanisms through the actions of a class of proteins known as?
- (a) carcinogen
  - (b) metastasis suppressors
  - (c) sarcoma
  - (d) carcinoma
  - (e) none
25. P-APC gene is helpful in controlling ----- in the intestine?
- (a) translocation
  - (b) differentiation of cells in the epithelium
  - (c) differentiation of cells during cell division
  - (d) DNA transcription
  - (e) none
26. Cells with mutations in P-APC lose their ability to control ----- levels?
- (a) FAD

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

- (b) beta-catenin
- (c) CDKs levels
- (d) cyclins
- (e) P-APC

27. DNA viruses which cause epithelial tumors are?

- (a) adenovirus
- (b) polyoma
- (c) papilloma virus
- (d) retrovirus
- (e) HPV

28. raf oncogene of virus 3611 murine sarcoma virus of mouse function in?

- (a) Tyrosine-specific protein kinase
- (b) serine/threonine protein kinase
- (c) GTP-binding protein
- (d) transcription factor
- (e) all

29. Spread of metastases may occur via?

- (a) both 1&2
- (b) blood
- (c) lymphatics
- (d) nerves
- (e) both1&3

30. Oncogenes were first discovered in the genome of?

- (a) Bacterial DNA
- (b) RNA viruses
- (c) DNA viruses
- (d) yeast cells
- (e) Bacterial RNA

31. Which tumor suppressor gene will triggers apoptosis?

- (a) src
- (b) p53
- (c) PRB
- (d) v-rel
- (e) rel

32. Regulation of transition between different phases of cell cycle is done at?

- (a) latent point
- (b) checkpoints
- (c) Transition point
- (d) regulatory point
- (e) none

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

33. Normal cells can be converted to cancerous cells by treating the cells with?

- (a) all
- (b) mutagenic chemicals
- (c) radiations
- (d) viruses
- (e) none

34. Most important cell-cycle checkpoints is?

- (a) all
- (b) TATA BOX
- (c) START
- (d) CKDs
- (e) none

35. Rous sarcoma virus was first identified in?

- (a) endothelial cells of mouse
- (b) connective tissue of chickens
- (c) epithial cells of humans
- (d) brain cells of rat
- (e) connective tissue of humans

36. Deregulation of checkpoints in cancer cells is due to?

- (a) all
- (b) external injuries
- (c) genetic defects
- (d) hypertension
- (e) none

37. Cyclin-dependent kinases (CDKs) will regulates the activities of other proteins by transferring?

- (a) CH<sub>3</sub>
- (b) phosphate
- (c) Mg<sup>++</sup>
- (d) Co<sup>++</sup>
- (e) none

38. Chromosomal location of retinoblastoma RB gene is?

- (a) 5q21
- (b) 13q14.3
- (c) 17p13.1
- (d) 2q16
- (e) 11pB

39. Programmed cell death is activated by?

- (a) TP53
- (b) BAX gene
- (c) proto-oncogenes
- (d) P-APC
- (e) ALL

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

40. Which gene among them will cause cancer?
- (a) env
  - (b) v-src
  - (c) pol
  - (d) gag
  - (e) all
41. White blood cell cancer associated with reciprocal translocations?
- (a) CML
  - (b) Burkitt,s lymphoma
  - (c) bladder cancer
  - (d) lukemia
  - (e) Brain cancer
42. Which of the following is a GTP-binding protein virus in rat?
- (a) McDonough feline sarcoma virus
  - (b) kirsten murine sarcoma virus
  - (c) MH2virus
  - (d) Y73 sarcoma virus
  - (e) rous sarcoma virus
43. Which of the following statement is correct ?
- (a) p53 contain 325 amino-acids
  - (b) p53 plays a key role in cellular responses in cancerous cells
  - (c) p53 will activate p21 which phosphorylation activates the CDKs
  - (d) p53 is a dimer
  - (e) all
44. Dysfunctional move into S phase without repairing their damaged DNA leads to the formation of?
- (a) progenitor cells
  - (b) cancerous cells
  - (c) nerve cells
  - (d) epithial cells
  - (e) all
45. oncogene present in chicken which is tyrosine-specific protein kinase?
- (a) rel
  - (b) yes
  - (c) abl
  - (d) src
  - (e) ros
46. Intestinal cancer occurs in individuals with inactivating mutation in --- genes?
- (a) all
  - (b) p53

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060



- (c) PRB
- (d) APC gene
- (e) none

47. The transfection test used to identify mutation in oncogenes of human bladder cancer was described by?

- (a) Alexander Fleming
- (b) Franz Knoop
- (c) Peyton Rous
- (d) Robert Weinberg
- (e) Snell

48. Important locus that influence both RB and p53 tumor suppressor genes is?

- (a) INK4A-ARF
- (b) INK4A-ARF
- (c) INK4A-ARF
- (d) INK2A-ARF
- (e) ALL

49. Among the following which is a tumor suppressor protein?

- (a) P-BRCA1
- (b) P-RB
- (c) p16
- (d) P-BRCA2
- (e) ALL

50. How many proteins are present in p53 protein?

- (a) 840
- (b) 393
- (c) 375
- (d) 250
- (e) 290

51. Anti-oncogenes which is involved in restraint of cell growth is called?

- (a) repressor cells
- (b) tumor suppressor genes
- (c) proto-oncogenes
- (d) malignant cells
- (e) none

52. c-ras mutations are inherited to next generation through ?

- (a) environmental factors
- (b) germ line mutations
- (c) somatic mutation
- (d) spontaneous mutation
- (e) none

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

53. Which among the following is oncogenes which encode for proteins of transcription factors?

- (a) v-myc
- (b) v-jam
- (c) v-fos
- (d) v-erbA
- (e) all

54. Aberrant activation of----- pathway can contribute to the oncogenicity?

- (a) anaerobic
- (b) mitogenic
- (c) carboxylic
- (d) aerobic
- (e) all

55. Which tumor suppressor gene is most frequently mutated in human cancers?

- (a) RB12
- (b) TP53
- (c) RB84
- (d) TP13
- (e) ALL

56. Which chromosome is known as philadelphia chromosome?

- (a) long arm of chromosome 12
- (b) chromosome 5
- (c) chromosome 22
- (d) chromosome 3
- (e) chromosome 9

57. Tumors formed due to activity of P-APC are called ?

- (a) both 1&2
- (b) polyps
- (c) adenomas
- (d) sarcoma
- (e) both1&3

58. Name one prominent factor in the response that arrests the cell cycle which is activated by P53?

- (a) TP53
- (b) p21
- (c) P-RB
- (d) P-APC
- (e) RB21

59. Chronic myelogenous leukemia(CML)is associated with an aberration in the chromosome no.

- (a) 12
- (b) 22
- (c) 5

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

- (d) 14
- (e) 6

60. P53 was originally discovered in----- cells?

- (a) all
- (b) SV40-transformed cells
- (c) epithial cells
- (d) RB12-transformed cells
- (e) none

61. Among the following which oncogene is present in mouse?

- (a) yes
- (b) fes
- (c) abl
- (d) src
- (e) rel

62. p21 is synthesized due to the cell stress by inactivating-----?

- (a) DNA repair
- (b) cyclins/CDKs complex
- (c) protein complex
- (d) DNA transcription
- (e) all

63. START usually occurs during?

- (a) mid-S
- (b) mid-G1
- (c) end of S
- (d) mid-G2
- (e) end-G1

64. The most common form of a dominant negative mutant is one that forms ----- protein containing both mutant and wild type subunits in p53?

- (a) monomeric
- (b) homomeric
- (c) heteromeric
- (d) polymeric
- (e) none

65. START checkpoint control entry into ----- phase of cell cycle?

- (a) prophase
- (b) G1 phase
- (c) G2 phase
- (d) S phase
- (e) Interphase

66. The cellular homologue of viral oncogenes are called as?

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

- (a) oncogenes
- (b) progenitor cells
- (c) tumor-suppressor cells
- (d) proto oncogenes
- (e) none

67. Tumor T antigens have a variety of function in ----- type of cycle

- (a) translation
- (b) lytic
- (c) lysogenic
- (d) translocation
- (e) reciprocation

68. Name the biologicals techniques involved in diagnosing metastatic tumor?

- (a) X-rays
- (b) FISH
- (c) DNA microarray
- (d) karyotyping
- (e) all

69. McDonough feline sarcoma virus is present in?

- (a) mouse
- (b) cat
- (c) chicken
- (d) rat
- (e) all

70. Mutation in p53 will cause?

- (a) all
- (b) increases in its half-life
- (c) decrease in its life-life
- (d) no change in half-life
- (e) none

71. The important of the connection between tumorigenesis and loss of apoptosis is also shown by the properties of the ----- oncogenes?

- (a) RB
- (b) bcl2
- (c) bcl8
- (d) p53
- (e) all

72. LOSS OF ----- FUNCTION WAS CONNECTED TO THE GENOME WIDE INSTABILITY OBSERVED IN HNPCC TUMORS?

- (a) P-RB
- (b) hMSH2
- (c) TP53

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

- (d) P-APC
- (e) P53

73. When tumor cells metastasize, the new tumor is called as?

- (a) both 1&2
- (b) secondary tumors
- (c) metastatic tumor
- (d) primary tumors
- (e) all

74. RB is a tumor suppressor that controls?

- (a) transcription
- (b) replication
- (c) cell-cycle
- (d) DNA repair
- (e) all

75. P-RB will stall the cell cycle in G1 phase through its negative interaction with ---- transcription factor?

- (a) cyclins
- (b) E2F
- (c) G2C
- (d) CDKs
- (e) all

76. START is regulated by ---- type of cyclins?

- (a) B-type
- (b) L-type
- (c) D-type
- (d) C-type
- (e) Q-type

77. Which cancer type was explained using Knudson's 2 hit hypothesis?

- (a) bladder cancer
- (b) retinoblastoma
- (c) burkitt's lymphoma
- (d) CML
- (e) all

78. Neurofibromatosis type1 is caused due to aberration in the chromosomal location?

- (a) 15q26.1
- (b) 17q11.2
- (c) 22q12.2
- (d) 13q14.3
- (e) 3p25

79. genes present in RNA genome of retrovirus is?

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009  
**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

- (a) all
- (b) gag
- (c) pol
- (d) env
- (e) none

80. Fugunami sarcoma virus of chicken was encoded by oncogenes?

- (a) yes
- (b) fps
- (c) fos
- (d) fms
- (e) src

81. Which oncogene was identified as the transforming function of the avian reticuloendotheliosis virus?

- (a) v-onc
- (b) v-rel
- (c) v-src
- (d) ras
- (e) fos

82. Gardner-rasheed felive sarcoma virus of cat encoded by ongene?

- (a) ros
- (b) fgs
- (c) fps
- (d) fos
- (e) rel

83. Name the intracellular adhesion protein molecule which is absent in cancer cells used in binding cells together?

- (a) all
- (b) beta-catenin
- (c) Cadherins
- (d) mutases
- (e) none

84. Which of the following statement is correct from the following?

- (a) damaged DNA are rectified in the G1 phase in cancer cells
- (b) cancer cells develop when cyclin/CDK complex are formed
- (c) cancer cells develop when cyclin/CDK complex do not form
- (d) DNA replication is restricted in cancerous cells
- (e) all

85. VHL gene defect will leads to?

- (a) Von Hippel-lindau disease
- (b) Bloom's syndrome
- (c) Ataxia telangiectasia

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

- (d) wilms tumor
- (e) all

86. Among the following which cancer type is inherited as rare autosomal dominant condition?

- (a) all
- (b) familial adenomas polyposis(FAP)
- (c) colorectal cancer
- (d) phenyl ketonuria
- (e) none

87. WHICH OF THE FOLLOWING IS INCORRECT?

- (a) cyclin/CDKs complex is formed in cancerous cells
- (b) cancer cells have irregular cell division
- (c) in cancer cells START checkpoint is dysfunctional
- (d) CDKs may be mutated in cancerous cells
- (e) none

88. In which class of genes do dominant gain of function mutation cause cancers?

- (a) progenitor cells
- (b) oncogenes
- (c) tumor suppressor genes
- (d) proto oncogenes
- (e) all

89. env gene of RNA gene of retrovirus will encode for?

- (a) protein kinase
- (b) reverse transcription
- (c) capsid protein of virion
- (d) protein of viral envelope
- (e) none

90. Which viral class will inactivate tumor suppressor oncogenes?

- (a) adenovirus
- (b) polyoma
- (c) HPV
- (d) retrovirus
- (e) all

91. The first tumor inducing virus was discovered by?

- (a) Alexander Fleming
- (b) franz knoop
- (c) Peyton Rous
- (d) Robert weinberg
- (e) david&sneel

92. Which of the following virus will cause myeloblastic leukemia?

- (a) avian erythroblastosis

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060

- (b) abelson leukemia
- (c) fujinami sarcoma
- (d) avian myeloblastosis
- (e) all

93. Catalytically active CDKs are regulated by the activity?

- (a) transferring water molecules
- (b) transferring phosphate group
- (c) by transferring carbonate group
- (d) by transferring carboxyl group
- (e) all

94. Which of the following are the distinct domains of p53?

- (a) ALL
- (b) N-terminal transcription activation domain(TAP)
- (c) a-central DNA-binding core domain(DBD)
- (d) C-terminal homo-oligomerization domain(OP)
- (e) none

95. In c-ras oncogenes mutations involve amino acids changes in one of three positions. Identify the positions

- (a) 15,30,46
- (b) 12,59,61
- (c) 10,55,60
- (d) 8,25,65
- (e) 11,37,63

96. Activation of----- identifies the pathway that is involved with maintaining genome stability?

- (a) P21
- (b) GADD45
- (c) GADD30
- (d) P53
- (e) ALL

97. Agents that cause transformation of normal cells into cancerous cells are called?

- (a) metastasis
- (b) mutagens
- (c) oncogenes
- (d) carcinogens
- (e) none

98. p53 IS ENCODED BY A TUMOR SUPPRESSOR GENE?

- (a) yes
- (b) APC
- (c) TP53
- (d) rel
- (e) src

**North Campus:** 2274, Hudson Line, Behind Khalsa College (DU), Kingsway Camp, Delhi -110 009

**South Campus:** 28-A/11A, 1st Floor, Jia Sarai, Near IIT, Hauz Khas, New Delhi -110 016

Contact Number: 9350232207, 9891602060



99. When cells detach from a tumor and invade to the surrounding tissues, then tumor is said to be ?

- (a) proto oncogenes
- (b) Benign tumor
- (c) malignant tumor
- (d) metastasis
- (e) tumor suppressor gens

100. Prostate cancer is caused due to mutation in -----gene?

- (a) BRCA1
- (b) HPC1
- (c) TP53
- (d) P21
- (e) BAX

grassroots