Past Papers

بسم الله الرحمن الرحيم

FINAL – Lecture 8 to 12

pathology

﴿ وَإِن تَتَوَلَّوْا يَسْتَبْدِلْ قَوْمًا غَيْرَكُمْ ثُمَّ لَا يَكُونُوا أَمْثَالَكُم ﴾

اللهم استعملنا ولا تستبدلنا

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Note: you might find some overlap with the previous lectures

Accumulation of misfolded proteins in the cytoplasm, activates which of the following enzymes

1. Caspases
2. Glutathione peroxidase
3. Telomerase
4. Superoxide dismutase
5. Bax/Bak activation

Answer :C

Which of the following molecules is anti-apoptotic:

A. Bax
B. P53
C. BCl-2
D. Bak
E. CytC

Answer : C

intrinsic pathway of apoptosis is initiated by all the following except:

A. Loss of survival signal
B. DNA damage
C. protein misfolding
D. type 1TNF receptor

Answer : D

A 38-year-old woman has abdominal distention that has been worsening for the past 6 weeks. An abdominal CT scan shows bowel obstruction caused by a 6-cm mass in the jejunum. At laparotomy, a portion of the small bowel is resected. Flow cytometric analysis of a portion of the tumor shows a clonal population of B lymphocytes with high Sphase. Translocation with activation of which of the following nuclear oncogenes is most likely to be present in this tumor?

A. APC
B. EGF
C. MYC
D. p53
E. RAS

Answer :C

A 70-year-old woman reported a 4-month history of a 4-kg weight loss and increasing generalized icterus. On physical examination, she has mi epigastric tenderness on palpation. An abdominal CT scan shows a 5-cm mass in the head of the pancreas. Fine-needle aspiration of the mass is performed. On biochemical analysis, the neoplastic cells show continued activation of cytoplasmic kinases. Which of the following
genes is most likely to be involved in this process?

A. APC
B. EGF
C. MYC
D. RAS
E. RET

Answer :D

A 30-year-old man has a pheochromocytoma of the left adrenal gland; a sibling had a cerebellar hemangioblastoma. He undergoes adrenalectomy, and on microscopic examination there is extensive vascularity of the neoplasm. Mutational analysis of the neoplastic cells shows that both allelic copies of a gene have been lost, so that a protein that binds to hypoxia-inducible factor 1-alpha is no longer ubiquitinated, but instead translocate to the nucleus and activates transcription of VEGF. Which of the following genes is most likely mutated in this man?

A. APC
B. BCL2
C. EGF
D. HER2
E. VHL

Answer :E

35-year-old man living in a southern region of Africa presents with increasing abdominal pain and jaundice. He has worked as a farmer for many years, and sometimes his grain has become moldy. Physical examination reveals a large mass involving the right side of his liver, and a biopsy specimen from this mass confirms the diagnosis of liver cancer (hepatocellular carcinoma). Which of the following substances is most closely associated with the pathogenesis of this tumor?

A. Aflatoxin B1
B. Direct-acting alkylating agents
C. Vinyl chloride
D. Azo dyes
E. β-naphthylamine

Answer :A

Which one of the listed statements best describes the mechanism through which Fas (CD95) initiates apoptosis?

A. BCL2 product blocks bax channels
B. Cytochrome c activates Apaf-1
C. FADD stimulates caspase 8
D. TNF inhibits IKB
E. TRADD stimulates FADD

Answer :C

A patient presents with a large wound to his right forearm that is the result of a chain saw accident. You treat his wound appropriately and follow him in your surgery clinic at routine intervals. Initially his wound is filled with granulation tissue, which is composed of proliferating fibroblasts and proliferating new blood vessels (angiogenesis). Which of the following substances is thought to be the most important growth factor involved in angiogenesis?

A. Epidermal growth factor (EGF)
B. Platelet-derived growth factor (PDGF)
C. Transforming growth factor-alpha (TGF-α)
D. Transforming growth factor-beta (TGF-β)
E. Vascular endothelial growth factor (VEGF)

Answer :E

A 54-year-old woman notes a lump in her right breast. Physical examination shows a 2-cm mass fixed to the underlying tissues beneath the areola and three firm, nontender, lymph nodes palpable in the right axilla. There is no family history of cancer. An excisional breast biopsy is performed, and microscopic examination shows the findings in the figure. Over the next 6 months, additional lymph nodes become enlarged, and CT scans show nodules in the lung, liver, and brain. Which of the following molecular abnormalities is most likely to be found in her carcinoma cells?

A. -Amplification of the ERBB2 (HER2) gene
B. Deletion of one RB gene copy
C. Fusion of BCR and C-ABL genes
D. Inactivation of one BRCA1 gene copy
E. Mutation of one p53 gene copy

Answer :A

A 61-year-old woman has noted a feeling of pelvic heaviness for the past 6 months. On physical examination, there is a palpable nontender lower abdominal mass. An abdominal ultrasound scan shows a 12-cm solid mass in the uterine wall. A total abdominal hysterectomy is performed. The mass has the microscopic appearance of a well-differentiated leiomyosarcoma. One year later, a chest radiograph shows a 4-cm nodule in her right lower lung. Cytologic analysis of a fine-needle biopsy specimen of the nodule shows a poorly differentiated sarcoma. The patient's medical history indicates that she has smoked cigarettes most of her adult life. Which of the following mechanisms best explains these findings?

A. Continued cigarette smoking by the patient
B. Development of a second primary neoplasm
C. Inheritance of a defective RB gene
D. Immunodeficiency with HIV infection
E. Metastasis from an aggressive tumor subclone

Answer :E

A 3-year-old child has exhibited difficulty with vision in her right eye. On physical examination, there is leukocoria of the right eye, consistent with a mass in the posterior chamber. MR imaging shows a mass that nearly fills the globe. The child undergoes enucleation of the right eye. Molecular analysis of the neoplastic cells indicates absence of both copies of a gene that contributes to control of the cell cycle. Which of the following genes has most likely undergone mutation in this neoplasm?

A. BCR-ABL
B. BCL2
C. RB
D. K-RAS
E. NF1
F. p53

Answer :C

A 76-year-old man has experienced abdominal pain for the past year. On physical examination, there is an epigastric mass. An abdominal CT scan shows a 10-cm mass in the body of the pancreas. A fine-needle biopsy specimen of this mass shows a moderately differentiated adenocarcinoma. Mutational analysis of the carcinoma cells shows inactivation of cyclin dependent kinase inhibitor with loss of growth-suppression. Regulatory pathways controlled by which of the following genes are most likely altered in this man's carcinoma?

A. BCL2
B. β-Catenin
C. MYC
D. p53
E. TGF-β

Answer :E

A 26-year-old man with a family history of colon carcinoma undergoes a surveillance colonoscopy. It reveals hundreds of polyps in the colon, and two focal 0.5-cm ulcerated areas. A biopsy specimen from an ulcer reveals irregularly shaped glands that have penetrated the muscular layer. Which of the following molecular events is believed to occur very early in the evolution of his colonic disease process?

A. Activation of the WNT signaling pathway
B. Inability to hydrolyze GTP-bound RAS
C. Loss of heterozygosity affecting the p53 gene
D. Mutations in mismatch repair genes.
E. Translocation of BCL2 from mitochondria to cytoplasm

Answer :A

A 63-year-old man has a cough with hemoptysis for 10 days. He has a 65 pack-year history of smoking. A chest CT scan shows a 5-cm right hilar mass. Bronchoscopy is performed, and lung biopsy specimens show small cell anaplastic lung carcinoma. His family history shows three first-degree maternal relatives who developed leukemia, sarcoma, and carcinoma before age 40 years. Which of the following gene products is most likely to have been altered by mutation to produce these findings?

A. APC (tumor suppressor)
B. BCL2 (anti-apoptosis)
C. K-RAS (GTP binding)
D. NF1 (GTPase activation)
E. p53 (DNA damage response)

Answer :E

18-In an experiment, cells from human malignant neoplasms explanted into tissue culture medium continue to replicate. This allows development of “immortal” tumor cell lines that are extremely useful for the study of tumor biology and responses to therapeutic modalities. Activation of which of the following molecular components is most likely to endow these tumor cells with limitless replicative ability in vivo and in vitro?

A. Hypoxia-induced factor 1
B. BCL2 gene
C. Cyclin-dependent kinase gene methylation
D. DNA replication repair
E. Telomerase

Answer :E

A 48-year-old woman notices a lump in her left breast. On physical examination she has a firm, nonmovable, 2-cm mass in the upper outer quadrant of the left breast. There are enlarged, firm, nontender lymph nodes in the left axilla. A fine-needle aspiration biopsy is performed, and the cells present are consistent with carcinoma. A lumpectomy with axillary lymph node dissection is performed, and carcinoma is present in two of eight axillary nodes. Reduced expression of which of the following molecules by the tumor cells is most likely responsible for the lymph node metastases?

A. Estrogen receptors
B. ERBB2 (HER-2)
C. E-cadherin
D. Progesterone receptors
E. Tyrosine kinases

Answer :C

A 12-year-old girl and a 14-year-old boy have developed skin nodules in predominantly sun-exposed areas of their skin over the past 5 years, but their six siblings have not. On physical examination, both children are of appropriate height and weight. The skin lesions are 1- to 3-cm maculopapular nodules that are erythematous to brown-colored and have areas of ulceration. Microscopic analysis of biopsy specimens of the skin lesions shows squamous cell carcinoma. The children have no history of recurrent infections, and their parents and other relatives are unaffected. Which of the following mechanisms is most likely to produce neoplasia in these children?

A. Inherited mutation of the p53 gene
B. Chromosomal translocation
C. Failure of nucleotide excision repair of DNA
D. Ingestion of food contaminated with Aspergillus flavus
E. Infection with human papillomavirus

Answer :C

A study of patients treated with chemotherapy protocols for cancer shows that 10% of them subsequently develop a second cancer, a much higher incidence compared with a control group not receiving chemotherapy. These chemotherapy protocols included the alkylating agent cyclophosphamide. What is the most likely mechanism by which this agent causes carcinogenesis in these treated cancer patients?

A. Activation of protein kinase C
B. Activation of endogenous viruses
C. Blockage of TGF-β pathways
D. Direct DNA damage
E. Inhibition of DNA repair
F. Inhibition of telomerase

Answer :D

A 33-year-old woman with multiple sexual partners has had vaginal bleeding and discharge for the past 5 days. On physical examination, she is afebrile. Pelvic examination shows an ulcerated lesion arising from the squamocolumnar junction of the uterine cervix. A cervical biopsy is performed and microscopic examination reveals an invasive tumor containing areas of squamous epithelium, with pearls of keratin. In situ hybridization shows the presence of human papillomavirus type 16 (HPV-16) DNA within the tumor cells. Which of the following molecular abnormalities in this tumor is most likely related to infection with HPV-16?

A. -Functional inactivation of the RB protein
B. Increased expression of epidermal growth factor receptor
C. Epigenetic silencing of the RB gene
D. Inability to repair DNA damage
E. Trapping of the RAS protein in a GTP-bound state

Answer :A

A 61-year-old man with a history of chronic viral hepatitis has noted a 6-kg weight loss over the past 5 months. Physical examination shows no masses or palpable lymphadenopathy. An abdominal CT scan shows a nodular liver with a 10-cm mass in the right lobe. A stool guaiac test result is negative. An elevation in which of the following laboratory tests is most likely to be present in this man?

A. Alpha-fetoprotein
B. RB
C. Calcitonin
D. P53
E. Immunoglobulin M

Answer :A

Which of the following mutation can cause cancer?

A. Decreased BCL2 expression
B. A translocation resulting in downregulation of RAS protein
C. MYC amplification
D. Increased expression of TP53
E. Deletion of a single RB allele. Both alleles need to be lost to cause cancer.

Answer :C

WNT signalling pathway causes:

A. Destruction of APC
B. Beta catenin activation
C. Stimulation of beta catenin destruction complex
D. Increased E cadherin expression
E. Downregulation of SLUG/SNAIL genes

Answer :B

A 37-year-old female developed right sided colon cancer. She has family history of colon cancer. Examining her colon showed a 4 cm tumor and numerous polyps. The most likely mutated gene in her case is: (she has familial adenomatous polyposis.)

A. APC
B. Beta catenin
C. E cadherin
D. Mismatch repair gene
E. ATM

Answer :A

A normal fibroblast can divide up to 70 times. In a fibrosarcoma, malignant fibrous cells still can divide after the 80th division. Which of the following genes is activated to acquire this ability?

A. Telomearse gene
B. Mismatch repair gene
C. Merlin gene
D. TWIST gene
E. Microsatellite instability gene

Answer :A

Malignant cells can suppress host immunity by:

A. CEA
B. alpha fetoprotein
C. TGF beta
D. IL 1
E. Mucin

Answer :C

Which of the following is the carcinogenic toxin present in cigarettes ?

A. Polycyclic hydrocarbons
B. Benzo pyrene
C. Nitrites
D. Aflatoxin B
E. Naphthalamine

Answer : B

Which gene among the following, when expressed , leads to an increase in growth signal expression for colon cancer?

A. MYC
B. RAS
C. Beta catenin
D. RB

Answer :A

RB is inhibited by?

A. Cyclin E
B. Cyclin D/CDK
C. CDKI
D. Cyclin B

Answer : B

Which of the following is an oncofetal protein?

A. CEA.
B. PSA.
C. TGF beta.
D. MYC.
E. RAS.

Answer : A

Which of the following is not included in the extrinsic pathway of apoptosis?

A. FADD
B. Caspase 8
C. Caspase 3
D. FLIP

Answer : D

The increase of which of the following prevents apoptosis?

A. BAD
B. BID
C. PUMA
D. BAX
E. BCL2

Answer : E

Which of the following is a nuclear transcription factor:

A. MYC.
B. E-cadherin.
C. RAS.
D. Cyclin D.
E. ABL.

Answer : A

In an experiment, it is observed that chronic, increased exposure to ionizing radiation results in damage to cellular DNA. Therefore, a protein is

now absent that would arrest the cell in the G1 phase of the cell cycle.

The absent protein is most likely the product of the following gene:

A. RAS
B. TP53
C. MYC
D. ABL
E. BCL-2

Answer : B

Cell division in malignant neoplasms is aided by the presence of an enzyme which repairs progressive chromosomal shortening. The lack of chromosomal shortening allows the malignant cells to undergo many more divisions than the normal cells. Which of the following enzymes is most likely to have this effect?

A. Reverse transcriptase
B. DNA polymerase
C. Telomerase
D. Protein kinase
E. Topoisomerase

Answer : C

لا تنسوا الدعاء لاهلنا في غزة.
واخر دعواهم أن الحمد لله رب العالمين.

Finally, we wish you all the best with your exams.
We were glad to assist you as much as we could.

see you next semester…

For any feedback, scan the code or click on it.

Corrections from previous versions:

Versions	Question #	Before Correction	After Correction
V1 → V2			
V2 → V3			