Intro to pathology, neoplasia,20/21.
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1. A 55-year-old male, a heavy smoker, developed a squamous cell carcinoma of the right lower lobe of the lung. Which of the following is the most likely precursor (premalignant lesion) of his cancer?

A. Severe dysplasia of the respiratory epithelium. Respiratory epithelium is glandular. Dysplasia in glandular epithelium can progress to adenocarcinoma, not squamous.
B. **Moderate dysplasia of metaplastic squamous epithelium. Squamous cancer originates only from squamous epithelium**
C. Mild dysplasia of goblet cells. Goblet cells are glandular cells
D. Reactive hyperplasia of the bronchial mucosa. Hyperplasia is a reactive process and bronchial mucosa is glandular.
E. Carcinoma in situ of the pseudostratified columnar epithelium. Columnar progresses to adenocarcinoma not squamous.

2. A well circumscribed lesion composed of well differentiated fibroblasts with no cellular pleomorphism or hyperchromatic nuclei is a: we are describing a benign tumor originating from fibroblasts, so it is :

A. **Fibroma**
B. Fibrosarcoma
C. Fibrocarcinoma
D. Hamartoma
E. Choristoma

3. A mass composed of normal looking pancreatic tissue present in the wall of the stomach is a: normal tissue in an abnormal location = choristoma

a. Teratoma
b. Hamartoma
c. **Congenital anomaly; choristomas are congenital anomalies, not true neoplasms.**
d. Benign neoplasm: no, they are not neoplastic
e. Premalignant lesion

4. Which of the following tumors can metastasize? Here I'm asking about the malignant OMA (the exceptions)

a. **Melanoma**
b. Lipoma
c. Adenoma
d. fibroma
e. choristoma

5. A malignant tumor of the stomach is composed of glandular structures that look morphologically very similar to the normal gastric gland is a : here I'm asking about differentiation; well differentiated tumors = grade 1 look similar to the cell of origin.

a. Grade 3 adenocarcinoma
b. Stage 3 adenocarcinoma
c. **Grade 1 adenocarcinoma**
d. Stage 1 adenocarcinoma: stage refers to extent of spread not morphology
e. Adenocarcinoma which can be of any grade or stage.

6. One of the following is not a feature of dysplasia:

a. Can regress if it is mild. Correct
b. Can progress to cancer even if it is mild.Correct
c. It is not neoplastic Correct
d. Abnormal mitosis is a histologic feature correct
e. **Nucleocytoplasmic ratio is preserved, no, N/C ratio is increased.**

7. Sarcomas usually metastasize through: this is a straightforward question
   A. **Blood vessels**
   B. Lymphatics
   C. Peritoneal seedings
   D. Needle tracts and surgical operations
   E. They do not metastasize

8. All of the following mutations can cause cancer except:
   a. deletion of both TP53 alleles, yes, and both must be deleted as it is a tumor supressor gene
   b. overexpression of a single RAS allele, yes, one allele is enough because this is an oncogene
   c. **amplification of both RB alleles. Wrong, RB is tumor suppressor so to cause cancer the genes must be deleted or inhibited.**
   d. ABL-BCR translocation correct
   e. Overexpression of a single EGFR allele, correct

9 .MIB 1 is an immunohistochemical stain used to highlight mitotically active cells. Of the following tumors, which one will show low staining with MIB 1? Here I am asking which of the following is benign because rate of growth (as judged by mitotic activity) is slow in benign tumors

A. **teratoma**
B. Liposarcoma
C. grade 3 adenocarcinoma
D. seminoma
E. Lymphoma

10 .Micro RNAs are:
A. Short double stranded segments of nucleic acids. No, they are single stranded
B. Modulate gene expression by increasing DNA mythelation, no they affect posttranscription of proteins
C**. Inhibitors of protein translation, correct**
D. Negative regulators of gene expression that work at the transcription level, **no they work at posttranscriptional level**
E. Inhibitors of mRNA formation, no, they do not mRNA formation (don't affect transcription)

11. which of the following statements is **correct** regarding tumours' changes in metabolism ?
A. Warburg metabolism ensures obtaining the maximum energy from each mole of glucose consumed. No, they get less energy but more carbon atoms
B. metabolic switch to aerobic glycolysis is enhanced by oncogene overexpression correct, and by inhibition of tumor suppressor genes also.
C. IDH mutations result in oncometabolites that cause changes in micro RNAs leading to carcinogenesis. No they affect mythelation and cause epigenetic changes.
D. Autophagy in tumor cells is inhibited during chemotherapy treatment. stimulated
E. Warburg effect is facilitated by overactivation of tumor suppressor genes.no, by decreased tumor suppressor genes

12. Which of the following statements is incorrect regarding epithelial- mesenchymal transition (EMT) in neoplasia?
A. EMT is a process aiming at acquiring a phenotype that permits increased motility of cells.
B. SLUG and SNAIL transcription factors are downregulated in this process. They are stimulated of course.
C. E cadherin is downregulated.
D. EMT is essential for tumor invasion and metastasis
E. Cells acquire actin filaments during EMT.

13. Which of the following statements is incorrect regarding P53: This question will be deleed. It has 2 answers. Sorry for that.
A. **When phosphorylated it inhibits Rb protein causing cell cycle arrest**. It actually stimulates RB.
B. Is inhibited by binding to HPV. correct
C. During hypoxia p53 induces DNA repair and inhibits cell senescence, wrong, it stimulates senescence
D. Mutated p53 enables malignancy by increases the chance of accumulation of other genetic mutations. correct
E. Patients with Li-Fraumeni syndrome inherit a mutated copy of P53. correct

14. 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. She has a genetic mutation that results in stimulation of which of the following proteins? She has FAP syndrome due to APC deletion. This APC deletion stimulated Beta catenin (no destruction complex is formed)
A. APC: this is the underlying mutation but the question asks about the stimulated protein as a result of this mutation.
B. **Beta catenin**
C. E cadherin: this actually decreases , when beta catenin is stimulated it increase SLUG/SNAIL which decrease E cadherin and facilitate metastasis.
D. Mismatch repair gene
E. ATM

15. 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? this is easy!
A. **Telomerase gene**
B. Mismatch repair gene
C. Merlin gene
D. TWIST gene
E. Microsatellite instability gene

16. Malignant cells can evade apoptosis by which of the following mechanisms? straightforward
A. Increased FADD protein
B. **Increased FLIP protein**
C. Increased mitochondrial permeability
D. Decreased bcl2
E. Decreased IPA

17. TP53 deletion or inactivation mutation results in: also straightforward
A. Increased Thrombospondin
B. Increased proapoptotic proteins
C. **aerobic glycolysis switch**
D. Increased expression of DNA repair genes
E. Increased hypoxia

18. A 47-year-old man presented with abdominal pain. Colonoscopy revealed a 7 cm tumor which on histological examination was a poorly differentiated adenocarcinoma. His lymph nodes were normal and imaging studies didn't show any metastases. Which of the following statements regarding his tumor's stage and grade is **incorrect:**
A. **T stage is determined by the size of his tumor**. Size has nothing to do with the stage in colon cancer. T in hollow organs (with lumen and wall) is determined by extent of wall invasion)
B. His N stage is considered N0. Correct. Normal lymph nodes= no lymph node involvement, so N stage is N0.

C. The poor differentiation is irrelevant to the stage**.** Correct, differentiation determines the grade not the stage
D. He has a grade 3 tumor. Correct, poor differentiation= grade 3
E. The 5-year survival of his tumor is expected to be better than that of another patient with distant mutases. Correct, the patient has no metastasis (M0). The presence of metastasis is the most important factor to determine survival.

19. Which of the following cells doesn't play a role in immunosurveillance? easy
A. Natural killer cells
B. **Plasma cell**
C. M1 macrophage
D. T helper lymphocyte
E. Cytotoxic T lymphocyte

20. Inherited skin cancer due to ultraviolet light is caused by a mutation in: easy
A. RAS gene
B. BRCA 1 gene
C. Recombination repair genes
D. TP53 gene
E. **Nucleotide excision repair genes.**

21. Hypercalcemia is considered a para-neoplastic syndrome in which of the following tumors?
A. parathyroid carcinoma, no because parathyroid normally secretes a hormone that causes hypercalcemia.
B. T2 N2 M1 breast cancer metastasizing to the bone. No, bone metastases can destroy bone and release calcium inside bone.
C. **T2 N1 M0 colon cancer, yes, normally the colon has nothing to do with calcium and since it is M0 then there is no metastasis to explain the hypercalcemia.**
D. Bone sarcoma. No, bone destruction due to the sarcoma can cause hypercalcemia.
E. Any tumor secreting parathyroid hormone, no, if the secretion is endogenous to the site (normally secreted) so it is not paraneopastic.

22. Malignant cells can suppress host immunity by: easy
A. CEA
B. alpha fetoprotein
C**. TGF beta**
D. IL 1
E. Mucin

23. A surgeon performing a mastectomy on a 55-year-old lady for breast carcinoma wanted to examine her lymph nodes to decide to remove them or not. He needs the answer during the operation; the best method to procced is with:
A. Fine needle aspiration of the lymph node
B. **Frozen section of the lymph node: this is done during operations**
C. Excisional biopsy of the lymph node
D. Blood test for serum markers
E. Cytology smear

24. A 65 year old woman has breast cancer that metastasized to the bone. She has no family history of breast cancer. The least likely mutated gene in her case is:
A. RAS
B. TP53
C. **BRCA 1 this is rare in sporadic breast cancer**
D. E cadherin
E. SLUG/SNAIL

25. Choose the incorrect combination:
A. H pylori and gastric carcinoma
B. HPV and nasopharyngeal carcinoma
C. EBV and T cell lymphoma
D. **Aphlatoxin B and pancreaticcarcinoma**: this causes hepatocellular carcinoma
E. HTLV1 and T cell lymphoma

26. A gastric carcinoma was found to grow in individual cell pattern with no glandular formation. Which of the following mutations s responsible for this morphology?
A. **E cadherin loss: this is responsible for adhesion, when lost tumors grow in an individual cell fashion.**
B. APC loss
C. MYC overexpression

D. SLUG/SNAIL inactivation: Note that SLUG/SNAIL activation decreases e cadherin. Their inactivation might increase it.
E. TP53 deletion

27.which of the following chemical agents can cause cancer without metabolic conversion? DIRECT ACTING
A. **Chemotherapy drugs**
B. polycyclic hydrocarbons
C. aromatic amines
D. nitrites
E. Aphlatoxin B

28. Which of the following definitions regarding neoplasms is **incorrect**?
A. Tumor autonomy: ability of tumors to proliferate regardless of normal regulatory mechanisms.
B. Clonality: tumor cells originating from one mutated cell.
C. Sarcoma: Malignant tumor originating from mesenchymal tissue**.**
D. **Tumor dormancy: rapidly proliferating tumor cells that cause recurrence after several years of removal of the primary tumor. They are dormant= non- dividing**
E. Tumor differentiation: The extent to which tumors resemble their cell of origin.

29. A year old man found to have a 3 cm colonic mass. Microscopic examination of the tumor revealed a poorly differentiated adenocarcinoma with areas of necrosis.
What is the most important staging factor in this patient? easy
A. Histologic grade
B. Presence of tumor necrosis
C. Presence of distant metastasis: this is alywas the most important factor.
D. Absence of tumor capsule
E. Number of mitotic figures

30. A 2GRADElipo year old boy was diagnosed with inherited form of retinoblastoma which is caused by homozygous loss of Rb gene. The main function of this tumor suppressor gene is: easy
A. Inhibition of activation of cyclin E/CDK2 complex
B. Inhibition of apoptotic genes
C. Activation of cytochrome c release
D. Activation of caspase 8
E. Activation of cytoplasmic kinases

31. Neurofibrumin 1 is a GAP (GTPase activating protein) . Inactivation mutations in this protein case cancer by activating which of following: easy
A. ABL
B. ALK
C. **RAS**
D. BCL2
E. P53