

Lesson 19 Study Guide: Medical Biotechnology Cancer Treatment

11. There have been genes that have been identified to be associated with certain types of cancer. Microarrays or biochips have been used to examine differences in RNA population in cancer v non-cancerous cells. Human cancer genes of special interest are

- (A) genes that are causally linked to cancer development or oncogenesis
- (B) those that have been introduced by genetic engineering
- (C) now being investigated in cloned humans who have had these genes removed from their genome
- (D) only simple somatic cell mutations
- (E) currently only those involved with breast cancer

12. One of the standards of care in cancer treatments include the use of chemotherapy. Many of the small molecule chemical drugs still used in modern chemotherapy are

- (A) carcinogenic
- (B) cytotoxic (kill fast growing cells)
- (C) not currently developed by large pharmaceutical companies
- (D) free of all side-effects
- (E) only placebos

13. Biopsy and histology has been an effective tool for staging of colon cancer using Dukes' staging. This type of staging works well only for very good / very poor prognosis patients (Dukes' stage A and D), but it is not very informative when predicting long-term outcomes of intermediate prognosis patients (Dukes' stage B and C). A bigger problem is that a biopsy and a Dukes' classification provides a only single snapshot in time... within the long natural history of a colon tumor (until the day of biopsy). Molecular staging in colon cancer may have the following implications:

- (A) There will be an increase of misdiagnosis
- (B) Molecular staging will be in the control of the big pharmaceutical companies who will prefer to keep it secret because it will decrease the sales of their most effective chemotherapies and decrease sales.
- (C) Molecular staging itself may cause cancer
- (D) Molecular staging may provide more accurate and early predictions of patient outcome than is currently possible with clinical staging
- (E) Directly cause an increase in health care costs and therefore be prohibitive

14. Progression of cancer development is thought to be due to both genetic and non-genetic changes at the molecular level. The result of clonal progression in carcinogenesis is

- (A) a fortunate event because it signals programmed cell death of the tumor**
- (B) a clone of cells that is unresponsive to normal growth controls, and is able to expand indefinitely.**
- (C) means that the cancer is untreatable**
- (D) a result of a gain in function of the tumor suppressor genes**
- (E) what renders some cancers as not dangerous**

15. The USS John Harvey, an American ship in Bari Harbor, carried a highly classified load of 2,000 100-lb mustard bombs on Dec 2, 1943 when a German raid damaged 17 ships, including the Harvey. Fire on the Harvey caused a mustard gas-laden smoke that spread quickly. 617 mustard gas poisoning cases among troops and merchant marine seamen occurred. Studies of mustard gas by two young assistant professors in Yale's new Department of Pharmacology, Louis S. Goodman, M.D., and Alfred Gilman, Ph.D had already shown interesting biological effects of mustard gas that eventually lead to the development of

- (A) radiation therapy**
- (B) chemotherapy**
- (C) molecular staging**
- (D) gene therapy**
- (E) stem cell therapy**

16. Going from a microscopic view of the histological appearance of tumors in biopsies to a molecular view of analyzing the genes that are expressed or not expressed in tumors can be done now by

- (A) Generating a molecular profile on a GeneChip (microarray)**
- (B) Sequencing all of the genes in the patient**
- (C) Comparing all the genes of a patient to a healthy individual**
- (D) Doing a 'Southern blot' on the patient's DNA**
- (E) Electron microscopy**

17. The growth of blood vessel is know to have a strong influence on tumor growth. AVASTIN is a very effect anti-cancer recombinant DNA drug that as an antibody reacts with VEGF to inhibit tumor

- (A) angiogenesis
- (B) DNA synthesis
- (C) transcription
- (D) protein production
- (E) origins

18. Herceptin is an antibody based drug that is produced from cloned DNA that has been introduced into cells so that it can be produced in large quantities. Herceptin binds to erbB2 and is very effective against what type of cancer?

- (A) Brain cancer
- (B) Herceptin treat all of these cancer types effectively
- (C) Breast cancer
- (D) Prostate cancer
- (E) Lung cancer

19. Antibodies have some distinct advantages over old school small molecule chemotherapies (such as mustard gas) for treating cancer because they

- (A) are highly specific
- (B) are ideal for extracellular targets involved with tumor growth
- (C) Eliminate potential for chemotype-based toxicities associated with small molecules
- (D) have a relatively long duration of coverage over the tumor target
- (E) All of these reasons

20. Avastin is a humanized antibody that binds the peptide factor VEGF with a half-life in humans of 17-21 days. This drug is produced from a cloned segment of DNA that has been introduced into cell culture to make a stable transgenic cell line. These cells are then grown in large fermentors that are then harvested and the antibody is then purified through biomanufacturing processes. This purified antibody is sold as the drug Avastin which when introduced into the patient will cause

- (A) The neutralization of VEGF that reduces or eliminates the ongoing angiogenesis in tumors**
- (B) Tumors to stop replicating their DNA**
- (C) Metastasis**
- (D) Debilitating side effects, such as paralysis**
- (E) a shortened death process**

21. Cancer grows

- (A) form whole organs, such as lung or breast cancer where every cell is affected at once**
- (B) out of normal cells in the body, usually originating from a single cell.**
- (C) as a consequence of 'sinful' behaviors, which can be prevented as lifestyle choices**
- (D) from sources which are non-biological in origin and still totally unknown**
- (E) as a result of metabolic pathways which have become non-biologically re-directed.**

22. It is often asked, "Why is there not a cure for cancer?" Some Cancer experts would disagree, and answer, "well there is, but which cancer do you mean?" There are many different types of cancer, so it is in fact, not one disease but many, all with slight genetic and biological differences. There are over 200 different known characterized cancers that afflict humans. The type of cancer is usually described by most people by

- (A) its organ of origin**
- (B) how curable it is**
- (C) the drugs that are most effective to treat it**
- (D) the cause of the disease**
- (E) its geographic or ethnic distribution**

23. Malignant tumors can invade nearby parts of the body. The malignant cancer may also spread to more distant parts of the body through the lymphatic system or bloodstream. This process is usually very difficult to treat and is a phase of cancer development called:

- (A) metaphase**
- (B) metabolic dystrophy**
- (C) metastasis**
- (D) catabolic carcinoma**
- (E) bloodstream carcinoma distribution**

24. When asked what the worst type of cancer was, one cancer expert answered, "the one you have". But in fact different cancer types vary in their growth and malignancies. Some abnormal cells grow in normal tissues, but are not cancerous. Not all tumors are cancerous. These types of tumors do not grow uncontrollably, do not invade neighboring tissues, do not spread throughout the body, and upon confirmation by a biopsy are called:

- (A) catastrophic**
- (B) benign**
- (C) extremely dangerous**
- (D) carcinoma invasivforma**
- (E) lackadaisical**

25. There are many causes of cancers, including:

- (A) Benzene and other chemicals**
- (B) Drinking excess alcohol**
- (C) Smoke inhalation (tobacco)**
- (D) Exposure to environmental toxins**
- (E) All of these may be involved**

26. Some recently identified associations with cancer onset as causes of the diseases, include: exposure excessive sunlight exposure, lack of exercise, obesity , exposure to radiation, and certain viruses. However, in a given population of people, give exposure to the same carcinogens, differences in cancer incidence can be attributable to:

- (A) differences in exposure**
- (B) genetics**
- (C) variation in the carcinogen**
- (D) severity of the type of cancer**
- (E) the type of chemotherapy chosen for treatment**

27. The organ of origin which is the leading cause of cancer deaths in the US per year is

- (A) Lung and bronchus (male and female, ~90,000 and 73,000)**
- (B) prostate (male, ~ 232,000)**
- (C) breast (female, ~211,000)**
- (D) colon (male and female, ~1,450,000)**
- (E) pancreas (male and female, ~650,000)**

28. Which type of cancer (as described by the organ of origin) which has caused the most cancer deaths in the US per year and is has increased most dramatically between 1960 and 1990, but then dropped most significant since 1990?

- (A) Colon**
- (B) Prostate**
- (C) Breast**
- (D) Lung and bronchus**
- (E) Pancreas**

29. The origin of cancer is called

- (A) cellular dystrophy**
- (B) metasis**
- C) carcinogenesis**
- (D) a benign tumor**
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31. Compounds or agents which may lead to the development of cancer can be evaluated by the "Ames Test". These compounds or agents are known as

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