

Lesson 18 Study Guide: Medical Biotechnology & Cancer

1. Cancer is widely believed to be a clonal disease, 'initiated' in a single cell and then, as an expanding colony of cells, of 'evolving' or 'progressing' growth, with successive genetic changes. The initiating events are widely thought to be

- (A) caused by nurture (environment only) rather than nature (genetics only)
- (B) unrelated to DNA sequences
- (C) genetic (mutation, translocation, amplification, etc.)
- (D) non-biological in origin and still totally unknown
- (E) a consequence of 'sinful' behaviors

2. Over 290 genes have been linked to cancer by identification of mutations in primary human tumors. These genetic changes in DNA linked to cancer include

- (A) Point mutations; those that are activating or inactivating
- (B) all of the types of mutations described in the other answers
- (C) Deletions/insertions/frame shifts
- (D) Translocations
- (E) Aneuploidy (an extra chromosome)

3. A biological positive feedback process in which events trigger other events in an ever-growing amplification, as in the growth of an embryo is called

- (A) catapulting
- (B) cogitation
- (C) convergent evolution
- (D) cascading
- (E) immortality

4. Cancer is a disease of

- (A) western civilization only primarily caused by bad diet
- (B) primarily the poor
- (C) accumulating genetic changes in everybody
- (D) only the elderly
- (E) consequences that are totally preventable

5. Since many cancers exhibit a 'field effect', elevated malignant potential across a target tissue or organ can cause can be seen in which of the following examples:

- (A) sun-exposed skin**
- (B) all of these example exhibit field effects**
- (C) HPV-infected uterine cervix**
- (D) smokers' lungs**
- (E) environmental air-borne toxins**

6. In the brief time you have to read these questions, ~60 more Americans will lose their fight with Cancer... One per minute... Every minute... Every hour... ~1500 more victims each day. Most of us know someone who has been touched by this disease and the socio-economic burden to the country is large. The financial costs of cancer 2017 in the US, according to NIH estimates are over

- (A) \$300.0 million**
- (B) \$189.8 billion**
- (C) Unable to be determined**
- (D) \$156.1 trillion**
- (E) over ten times the cost of the any war per year**

7. How a spider makes its web is indeed an amazing phenomenon. Just how smart is that spider to figure this out? Remember the idea of emergence that makes fractals or snowflakes appear very complicated when actually the patterns are based on very simple if/then rules. A cancer cell can "outsmart" the bodies immune system because:

- (A) the cancer cell actually has a higher IQ that most college freshmen**
- (B) feedback in biochemical networks involving a series of simple if/then rules**
- (C) complex cellular behavior of cancer is outside the realm of biology and is because of consciousness**
- (D) the cancer cell generates a natural form of LSD**
- (E) cancer cells have learned how to receive this knowledge to from universal teachings**

8. The way bacteria and cancer cells find food is similar and involves one of life's oldest forms response to chemical signaling. A bacterium swims by using their flagella. If one were to place a spot of acid on one side of a Petri dish containing bacterial growth media and a spot of sugar on the opposite side with the bacteria in the middle, they swim towards the sugar responding by chemical signaling creates the appearance of 'purpose' (which begs the question about the nature of purpose vs function). And we think our decision making processes are so complicated, because we are, after all humans (which begs the question about the nature of consciousness). This type of chemical signaling is called:

- (A) chemotaxis or "movement induced by chemicals"
- (B) positive reinforcement
- (C) fermentation
- (D) sexual orientation
- (E) graviperception

9. Many cancers exhibit a 'field effect', suggesting that many normal-appearing cells in a target tissue or organ may have elevated malignant potential. This is consistent with

- (A) that most cancers start with many cell
- (B) there is nothing anyone can do to prevent cancer
- (C) that cancer does not have a genetic component
- (D) a molecular genetic view of monoclonal progression
- (E) ancient Chinese herbals

10. As cancer develops, cells re-colonize previously normal tissues in a process called metastasis. Motion in living creatures which is directed by chemical signals and undirected by any choice or goal is known as;

- (A) molecular communication
- (B) random walk
- (C) chemotaxis
- (D) ecological feedback
- (E) untrue in nature