Quiz for Nanoparticles and Brain Tumors (Answer Key)

1. What problem was the nanoengineer trying to help the brain surgeon solve?
   A. To kill brain tumor cells by injecting them with nanoparticles.
   B. To ‘see’ a brain tumor in the operating room to make sure it is all removed.
   C. To preserve brain function by leaving small amounts of the tumor behind.
   D. To cut down the time of brain surgery by moving the pathologist into the operating room with the surgeon.

2. How will this new nanoparticle help cut down the time of a traditional brain tumor surgery?
   A. By eliminating the need to send samples of brain tissue to the hospital pathologist for testing.
   B. By allowing the surgeon more control of the patient and cancer cells during surgery.
   C. By allowing the hospital pathologist to test more quickly in the operating room.
   D. By eliminating the time taken by the surgeon to keep brain tissue healthy during surgery.

3. Besides cutting down on the time of the surgery, how will this new nanoparticle help brain tumor patients?
   A. By reducing the cost of the surgery by eliminating any need for MRI imaging.
   B. By reducing the size of the tumor, making it easier to remove.
   C. By putting nanoparticles inside the cell membrane, increasing the size of the cancer cells, making them more visible to the naked eye.
   D. By allowing the surgeon to get all the cancerous cells while leaving behind as many healthy brain cells, and therefore brain functions, as possible.

4. What three properties does the nanoparticle need to have?
   A. Blue color, small size to fit through the blood brain barrier and an attraction to cancer cells.
   B. Fluorescent, magnetic, and small size to fit through the blood brain barrier.
   C. Green color, magnetic and small size to fit through syringes for easy injecting.
   D. Magnetic, white glow and small size to fit through cell membranes.

5. The nano lab clean room protocols are to prevent what?
   A. Contamination of experiments by unwanted particles and to prevent particles from being taken in by people.
   B. Infection of people and experiments by dangerous bacteria and virus particles.
   C. The dangerous spread of nanoparticles through contact with skin, mouth, nose and eyes.
   D. People getting their clothes or skin stained by colored chemicals.
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6. Which of the following statements about engineering are true or false?
   A. There are usually multiple solutions to each problem.  True
   B. Some solutions don’t always work out.  True
   C. Engineers like fixing cars.  False
   D. Engineering helps people and improves lives.  True

7. Nanoengineering is a relatively new and exciting field. Which statement below is not true about nanoengineering?
   A. Sometimes the results are surprising, even to experienced engineers.
   B. It often takes repeated tries and testing to obtain the desired results.
   C. At the moment, it can only be used to change chemical equations, not help people.
   D. Substances can act differently at the nanoscale than they do in larger quantities.

8. The engineering process involves what steps?
   A. Buying a product to use at home and seeing if it works.
   B. Designing an ad campaign and then selling a product to consumers to make sure they know what the product will do.
   C. Establishing the goals to be met, testing to confirm the goals have been met and re-engineering if those goals have not been met.
   D. Establishing when the product is safe and then re-engineering that product to make it better looking to consumers.

9. Which statement below is correct regarding the example of engineering shown in this online activity?
   A. Engineering is dangerous and carcinogenic.
   B. Engineering involves collaboration with others to achieve good results.
   C. Engineering can only help people with brain cancer.
   D. Engineering is very predictable and straightforward.

10. What do you think next steps will be with this nanoparticle?
    A. Collaboration with the surgeon will continue so the particle can be tested in FDA clinical trials.
    B. Jessica will go back to the nano lab to reduce the size of the particle more.
    C. The surgeon will take the particle and begin helping patients with it right away.
    D. Additional colors of the particle will be developed to customize surgery to the patient’s preferences.