

3D Bioprinting Pre/Post-Quiz Answer Key

1. Which of the following most accurately describes 3D bioprinting?

- A. Manufacturing biological tissues and organs out of living cells *only* using a 3D bioprinter
- B. Manufacturing biological tissues and organs out of living cells and non-living biomaterials using a 3D bioprinter**
- C. Manufacturing non-living tissues and organs using a 3D printer that are intended for use in medicine
- D. Using living organisms to “print” biological tissues and organs that will be used in medicine

The PowerPoint® file presentation/lecture defines 3D bioprinting as a way of manufacturing biological constructs using a 3D bioprinter. The slide information further describes how both living cells *and* non-living biomaterials are used by a 3D bioprinter to generate viable tissues.

2. What is a potential benefit that could one day be achieved with 3D bioprinting?

- A. To help patients who are in need of new tissues or organs
- B. To aid in the testing of new drugs
- C. To reduce the risk of transplant rejection using host cells
- D. All of the above**

The slide information explains the potential for 3D bioprinting to one day generate transplantable tissues and full organs, as well as its current capability to aid in drug testing.

3. What is a current capability of 3D bioprinting?

- A. Printing tissue samples for use in drug testing
- B. Printing small organs like ears or bones
- C. Printing complex, functional organs like hearts and kidneys
- D. All of the above**

The slide information explains that drug testing as the only current capability of 3D bioprinting.

4. Which of the following is not a limitation of 3D bioprinting?

- A. The abundant and branched nature of the vasculature is difficult to reproduce
- B. Risk of immune rejection is high when using foreign materials
- C. Accurately printing tissues on the micro-scale**
- D. Finding long-lasting, biocompatible materials that will not have negative side-effects

The slide lecture specifically addresses the three main limitations of 3D bioprinting. In the “Types of Bioprinters” section, we learn that some bioprinters have nano-scale accuracy (1000 X more accurate than the micro scale).

5. Which of the following are considered types of extracellular matrix (ECM) biomaterials?

- A. Collagen
- B. Cardiac cells
- C. Elastin
- D. A and C**
- E. A, B, and C

Only A and C are considered ECM biomaterials. Although cells can be used in 3D bioprinting, the question is only referring to the non-cellular components of the printed tissue.