4. Histology and Embryology

Starter Quiz ·

University Medicine Name: _____ Score: _____

1. A cell is 20 µm across. How many 4 µm sections does it take to cut all the way through it?

   _____ sections

2. Why does the alveolus use simple squamous epithelium?

   ☐ It must resist abrasion

   ☐ Gas exchange needs the shortest possible diffusion path

   ☐ It needs many layers for protection

   ☐ It secretes large amounts of mucus

3. Which band keeps the same width when a sarcomere contracts?

   ☐ The distance between Z-lines

   ☐ The I-band

   ☐ The A-band

   ☐ The H-zone

4. Which layer is much thicker in an artery than in its companion vein?

   ☐ Tunica media

   ☐ Tunica intima

   ☐ Tunica adventitia

   ☐ The endothelium

5. Why does the proximal tubule have a brush border?

   ☐ To make hormones

   ☐ To sweep urine along

   ☐ Microvilli give the large surface needed to reabsorb about 65% of the filtrate

   ☐ To protect against abrasion

6. Which part of the blastocyst becomes the embryo itself?

   ☐ The zona pellucida

   ☐ The fluid-filled cavity

   ☐ The trophoblast

   ☐ The inner cell mass

7. A harmful drug first taken in week 20 of pregnancy is most likely to cause a major structural malformation such as a cleft palate.

   ☐ True ☐ False

8. A frozen section gives the same quality of detail as a paraffin section, only faster.

   ☐ True ☐ False

9. Blood is a connective tissue.

   ☐ True ☐ False

10. A sarcomere with a 1.6 µm A-band contracts to 2.0 µm. What is the total width of its I-band (both halves), in µm?

    _____ µm

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Answers ·

University Medicine

1. **5 sections**

   20 / 4 = 5, so any one section shows only a fifth of the cell; a nucleus may be missing from a cell's section.

2. **Gas exchange needs the shortest possible diffusion path**

   One flat layer, about 0.5 µm, keeps the path for O_2 and CO_2 as short as possible.

3. **The A-band**

   The A-band is the length of the myosin filaments, which never changes; the I-band and H-zone narrow as actin slides in.

4. **Tunica media**

   The smooth-muscle media handles the high, pulsing arterial pressure; veins carry low pressure and have thin walls.

5. **Microvilli give the large surface needed to reabsorb about 65% of the filtrate**

   Bulk reabsorption needs area, and microvilli multiply the cell's surface.

6. **The inner cell mass**

   The inner cell mass forms the embryo; the trophoblast forms the fetal part of the placenta.

7. **False**

   By week 20 the palate and other major structures have formed; later exposures more often affect growth and function.

8. **False**

   Ice crystals tear the tissue and detail is blurred; the frozen section trades quality for an answer within minutes.

9. **True**

   It has cells in a matrix, as every connective tissue does; its matrix is fluid plasma.

10. **0.4 µm**

    2.0 − 1.6 = 0.4 µm, down from 0.9 µm at rest: the I-band takes all the shortening.