**Extracellular matrix worksheet**

**Exercice 1: For each question choose only one answer**

1. **Which of the following statements is correct?**
2. Bacterial cells secrete materials that form an extracellular matrix
3. Extracellular matrix provides, structural support and helps to organize cells
4. Animal cells are surrounded by a rigid cell wall that provides structure and support
5. The extracellular matrix is secreted by all Eukaryotic cells
6. **The extracellular matrix is:**
7. Located inside cells
8. Found between cells
9. Only present in skin tissue
10. A cellular organelle
11. **Which of the following statements best describes the extracellular matrix**
12. In general it is the non-cellular components within animal tissues and organs
13. It contains approximately equal quantities of phospholipids and proteins [This is one of the characteristics of the cell membrane in generally
14. It only serves to separate the cells of a tissue
15. Its composition and physical properties are always the same, regardless of the tissue type, its location, and its physiologic state.
16. **Major components of the ECM include**
17. Fibrous proteins
18. Globular proteins
19. Peptidoglycan
20. Ribosomes
21. **Which of the following is not a component of the extracellular matrix**
22. Fibrous proteins
23. Glycosaminoglycans
24. Proteoglycans
25. Glycogen
26. **The ECM’s primary functions include:**
27. Mechanical support for cell anchorage
28. Synthesis of extracellular matrix proteins
29. DNA replication and cell division
30. Cell motility
31. **Polysaccharides**
32. Are the first major component, of the ECM of animals.
33. Among vertebrates, the most abundant types in the ECM are peptidoglycans
34. Provide a pathway for diffusion of water soluble traffic between the blood and tissue cells.
35. Their hydrated gel-like nature is primarily due to collagen
36. **Glycosaminoglycans**
37. are highly positively charged
38. have an important elasticity
39. are found abundantly in tissues that must be capable of easily stretching and then recoiling
40. contribute to tissue hydration due to their watery gel-like property
41. **Which one is a glycosaminoglycan ?**
42. Hyaluronic acid
43. Elastin
44. Collagen
45. Laminin
46. **The main function of hyaluronic acid is :**
47. Protein synthesis
48. Energy production
49. Tissue hydration
50. Hormone production
51. **ECM proteoglycans**
52. Provide resistance to compression
53. Once secreted from cells, these macromolecules form a fibrous component in the ECM.
54. Are formed from peptidoglycans linked to core proteins
55. Are a fibrous proteins.
56. **The hydrated gel-like nature of ECM is primarily due to**

 a) Collagen

 b) Elastin

 c) Glycosaminoglycans

 d) Fibronectin

1. **Collagen**
2. is the most abundant fibrous protein in the plant kingdom.
3. forms cable-like fibres or sheets that provide tensile strength (resistance to longitudinal stress).
4. from the Greek, meaning gel producing
5. is a globular protein.
6. **In bone tissue, collagen provides**:
7. Flexibility only
8. Resistance to the stretching force
9. Tensile strength
10. Electrical conductivity
11. **Collagen synthesis requires which vitamin:**
12. Vitamin A
13. Vitamin B
14. Vitamin C
15. Vitamin D
16. **Which component provides the most tensile strength to the ECM ?**
17. Elastin
18. Collagen
19. Laminin
20. Fibronectin
21. **Elastin’s main characteristic is :**
22. Rigidity
23. Elasticity
24. Watery gel-like property
25. Resistance to compression
26. **Elastin is particularly important in :**
27. Hair
28. Lungs
29. Bones
30. Teeth
31. **The elastic properties of elastin are due to :**
32. Its long, unbranched structure
33. its highly negative charge
34. Its ability to stretch and recoil
35. Its nuclear location
36. **Laminin is primarily found in :**
37. Basal lamina
38. Nuclear lamina
39. Cell membrane
40. Golgi apparatus

**Exercise 2: For each question multiple answers are possible**

1. **The main function of fibronectin is :**
2. Tissue hydration
3. Cell adhesion
4. Resistance to compression
5. To bind other components of the extracellular matrix and cell adhesion molecules
6. **GAGs are characterized by (multiple answers) :**
7. Repeated disaccharide units
8. High negative charge
9. Ability to bind water
10. Protein synthesis
11. **The basal lamina is (multiple answers) :**
12. a specialized part of the extracellular matrix
13. located adjacent to the epithelial cells
14. mainly composed of laminin
15. located right beneath the inner nuclear membrane
16. **Which of the following statements is correct? (Multiple answers):**
17. Laminin connects cells to the Extracellular Matrix
18. Laminin is a primary component of the cell membrane
19. Reduced amounts of fibronectin have been found within certain types of cancerous tissue
20. fibronectin promotes cell adhesion and holds cells in position
21. **ECM proteins (Multiple answers):**
22. The most abundant are those that form globular proteins
23. Can be grouped into structural proteins and Adhesive proteins.
24. In mammals, more than 25% of the total protein mass consists of collagen
25. One of the unique features of fibronectin is its ability to bind a large number of molecules

**Exercise 3: Conceptual Questions (continuous assessment (CA))**

1. Define the extracellular matrix. What are its main components?
2. What are the main roles of the extracellular matrix?
3. Explain how GAGs contribute to tissue hydration
4. Compare and contrast the mechanical properties of collagen and elastin.
5. A patient has a mutation in the elastin gene
* What tissues would be most affected?