

**Chapter 9**  
**Developmental Biology**

1. Which of the following are TRUE about somatic cells?
  - (A) They have a complete set of chromosomes
  - (B) They have chromosomes which come in pairs
  - (C) Skin cells and liver cells would be examples
  - (D) Sperm cells and egg cells would be examples
  
2. Stem cells can be obtained from
  - (A) Embryos
  - (B) Sperms
  - (C) some adult tissues
  - (D) umbilical cord blood
  
3. Which are examples of cell differentiation?
  - (A) Bone marrow cells are used to repair damage to heart tissues
  - (B) A fertilized egg to cell developed into an embryo
  - (C) A leaf cell divides as a plant leaf grows
  - (D) Stem cells from bone marrow develop into blood cells
  
4. Somite
  - (A) differentiate into myotomes which give rise to skeletal muscle in trunk and limbs
  - (B) differentiate into sclerotomes which give rise to vertebrae
  - (C) muscles of mastication arise from segmentation of the paraxial mesoderm
  - (D) differentiate into myotomes which give rise to skeletal muscle of the limbs
  
5. Following are four structures together with a germ layer. Identify the CORRECT association.
  - (A) Epithelium of pancreas – endoderm
  - (B) Hair – ectoderm
  - (C) Heart – mesoderm
  - (D) Epithelium of lung – mesoderm
  
6. Which of the following organs are derived from mesoderm?
  - (A) Skeletal musculature
  - (B) Musculature of blood vessels
  - (C) Suprarenal medulla
  - (D) Cardiac musculature
  
7. Which of the following combination of statements regarding Maturation Promoting Factor (MPF) are TRUE?
  - (A) MPF in amphibians cause cell lysis
  - (B) MPF in amphibians is composed of cyclins and CDKs
  - (C) MPF in amphibians undergoes periodic degradation
  - (D) MPF in amphibians undergoes periodic phosphorylation
  
8. Which one of the following glial cells are derived from the ectoderm?
  - (A) Astrocytes
  - (B) Microglial cells
  - (C) Oligodendrocytes

(D) Ependyma

9. Which of the following are somite derivative?
- (A) Cardiac muscle
  - (B) Skeletal muscle
  - (C) Cartilage
  - (D) Tendons
10. Mark the CORRECT match.
- (A) Hedgehog signaling – Plays critical role in facial morphogenesis in vertebrates
  - (B) Hox protein – Required for *Tbx* transcription factor expression for vertebrate limb development
  - (C) Wnt signaling – Involves frizzled receptor on target cell membrane and its mutation causes cyclopia
  - (D) Notch signaling – Involved in signaling at 4-cell embryo stage in *C. elegans* through glp I expression

**Answer**

- 1. (A), (B), (C)
- 2. (A), (C), (D)
- 3. (A), (B), (D)
- 4. (A), (B), (D)
- 5. (A), (B), (C)
- 6. (A), (B), (D)
- 7. (B), (C), (D)
- 8. (A), (C), (D)
- 9. (A), (B), (C)
- 10. (A), (B), (D)