2018 Stem Cells MCQ

2018 / H2 / ACJC PRELIM / P1 Q7

1 Which statements regarding stem cells are true?

1 Researchers can induce embryonic stem cells to differentiate into various cells and tissue types to repair damaged tissue.

2 The use of embryonic stem cells for research can be an ethical challenge as the continued destruction of embryos could desensitise medical communities to the destruction of life.

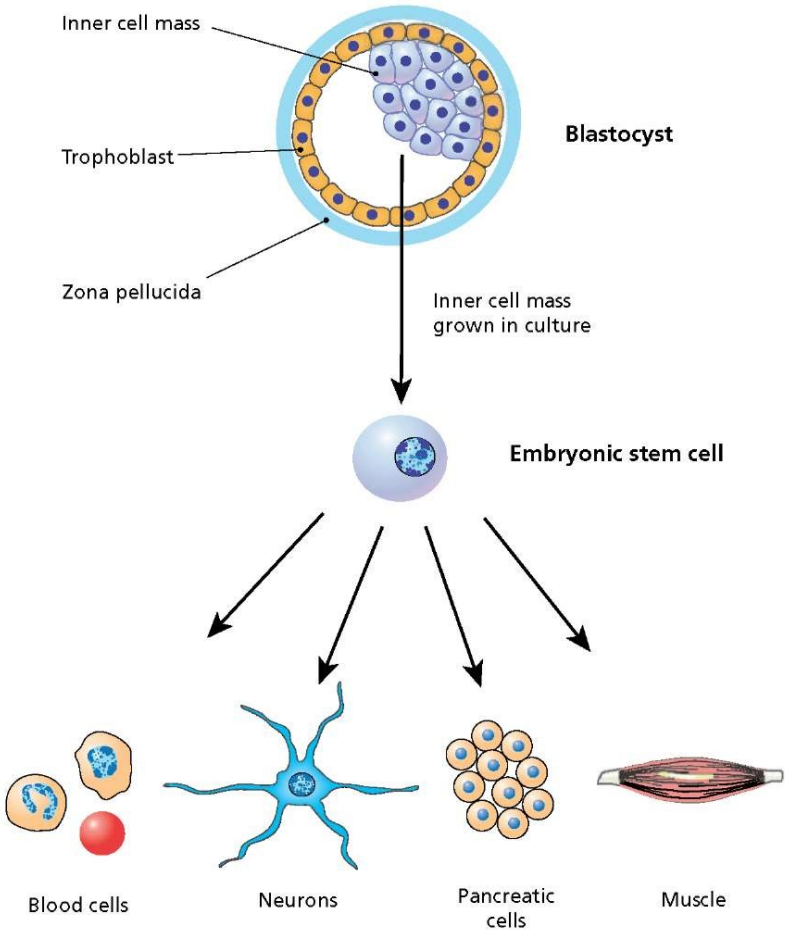
3 One of the normal functions of blood stem cells in a living organism is the transplantation of such stem cells from normal healthy bone marrow donors to leukemia patients for treatment.

4 Blood stem cells can potentially differentiate into neurones under appropriate chemical signals.

A 1, 2 and 3 **B** 1, 2 and 4 **C** 1 and 3 **D** 2 and 4

2018 / H2 / DHS PRELIM / P1 Q9

2 Which of the following features of the embryonic stem cells and specialized cells shown in the diagram are ***TRUE***?



	Embryonic stem cells	**Specialized cells**
A	Embryonic stem cells display greater plasticity when grown in culture than when in blastocyst.	The blood cells are genetically different from the embryonic stem cells but have shorter telomeres.
B	Embryonic stem cells are totipotent and are capable of differentiating into many different cell types.	The pancreatic cells are genetically identical to the embryonic stem cells but with a different set of genes expressed.
C	Embryonic stem cells are multipotent and are capable of differentiating into limited range of cell types.	The blood cells are genetically different from the embryonic stem cells because different genes are expressed.
D	Embryonic stem cells are pluripotent	The pancreatic cells are genetically

and are capable of differentiating into many different cells types.

identical to the embryonic stem cells but have shorter telomeres.

2018 / H2 / EJC PRELIM / P1 Q22

3 Healthy, embryonic stem cells offer great promise to the cure of many diseases because _____.

I They are totipotent.
II They are more readily available than other cells.
III They can be easily cultured *in vitro*.
IV They will differentiate in the presence of appropriate molecular signals and produce cells which are normal.

Which of the above statement(s) is/are true?

A II, III and IV

B I, III and IV

C I and IV

D IV only

2018 / H2 / JJC PRELIM / P1 Q9

4 Stem cells are found in many tissues that require frequent cell replacement such as the skin, the intestine or the blood.

However, within their own environments, a bone marrow cell cannot be induced to produce a skin cell and a skin cell cannot be induced to produce a bone marrow cell.

Which statement explains this?

A Different stem cells have only the genes required for their particular cell line.

B Genes not required for a particular cell line are methylated.

C Genes not required for a particular cell line are removed using restriction enzymes.

D mRNA that is not required for a particular cell line is destroyed.

2018 / H2 / MJC PRELIM / P1 Q18

QUESTION 5
Which of the following statement(s) is/are true regarding hematopoietic stem cells and cancer cells?

1 Both are able to move from one location to another.
2 Both are found in cancer patients.
3 Both are specialised cells and capable to differentiate further.
4 Both are capable of indefinite replication.

A 2 only **B** 1 and 3 **C** 2 and 4 **D** 1, 2 and 4

2018 / H2 / NJC PRELIM / P1 Q15

6 Which statements are **true** about all stem cells?

1 Stem cells can be induced to differentiate by environmental signals.

2 Stem cells are easily isolated and propagated.

3 Stem cells are able to develop into whole organisms if implanted into the womb.

4 Stem cells make more stem cells under appropriate conditions.

A 1 and 4

B 2 and 3

C 1, 3 and 4

D 1, 2, 3 and 4

2018 / H2 / NYJC PRELIM / P1 Q27

7 What is the role of stem cells with regards to the function of adult tissues and organs?

A Stem cells are fully differentiated cells that reside under the surface of epithelial tissue, in position to take over the function of the tissue when the overlying cells become damaged or worn out.

B Stem cells are totipotent cells that divide asymmetrically, giving rise to one daughter cell that remains a stem cell and one daughter cell that will differentiate to replace damaged and worn out cells in the adult tissue or organ.

C Stem cells are embryonic cells that persist in the adult, and can give rise to all of the cell types in the body.

D Stem cells are cells that have yet to express the genes and produce proteins characteristic of their differentiated state, but do so when needed for repair of tissues and organs.

2018 / H2 / NYJC PRELIM / P1 Q28

8 Stem cells are found in many tissues that require frequent cell replacement, such as the skin and the blood.

A bone marrow stem cell that is transferred to the skin is never induced to produce a skin cell, and a skin stem cell that is transferred to the bone marrow is never induced to produce a blood cell.

Which statement explains this?

A Binding of repressor molecules prevents the expression of genes not required for a particular cell line.

B Different stem cells have only the genes required for their particular cell line.

C Expression of genes not required for a particular cell line is controlled at translational level.

D Genes not required for the differentiation of a particular cell line are methylated.

2018 / H2 / RI PRELIM / P1 Q21

9 Totipotency is demonstrated when _____.

A cancer cells give rise to heterogeneous cell types

B a stem cell can differentiate into placental cells and all cells in an organism

C a hematopoietic stem cell differentiates into a lymphocyte

D an embryonic stem cell divides and differentiates

2018 / H2 / RVHS PRELIM / P1 Q7

10 Blood transfusion laboratories around the world are hoping to produce large numbers of red blood cells (RBCs) from 'spare' human embryos produced during *in vitro* fertilisation procedures.

Embryonic stem cells are removed from an embryo and cultured in a growth medium that stimulates their differentiation into RBCs.

Which statement correctly describes this differentiation?

A Multipotent embryonic stem cells differentiate into pluripotent blood stem cells and then into RBCs.

B Pluripotent embryonic stem cells differentiate into multipotent blood stem cells and then into RBCs.

C Totipotent embryonic stem cells differentiate into multipotent blood stem cells and then into RBCs.

D Totipotent embryonic stem cells differentiate into pluripotent blood stem cells and then into RBCs.

2018 / H2 / RI PRELIM / P1 Q24

11 Which is a correct statement about obtaining human embryonic stem cells for research?

1 Removal of these cells is considered to be ethically acceptable as normal development of the embryo is not inhibited.
2 The cells must be removed at an early stage of development from a region of the blastocyst known as the inner cell mass.
3 The cells must be removed immediately following the successful fertilisation of the ovum by the sperm, and after checking for normal mitotic division.

4 The region of the blastocyst from where the cells are removed is an area that develops at a later stage into the placenta.

A 2 only
B 1 and 2
C 2 and 3
D 3 and 4

2018 / H2 / TJC PRELIM / P1 Q9

1 Stem cells are found in many tissues that require frequent cell replacement such as the skin, the
2 intestine and the blood.

However, within their own environments, a blood cell cannot be induced to produce a skin cell and a skin cell cannot be induced to produce a blood cell.

Which statement explains this?

A Different stem cells have only the genes required for their particular cell line.

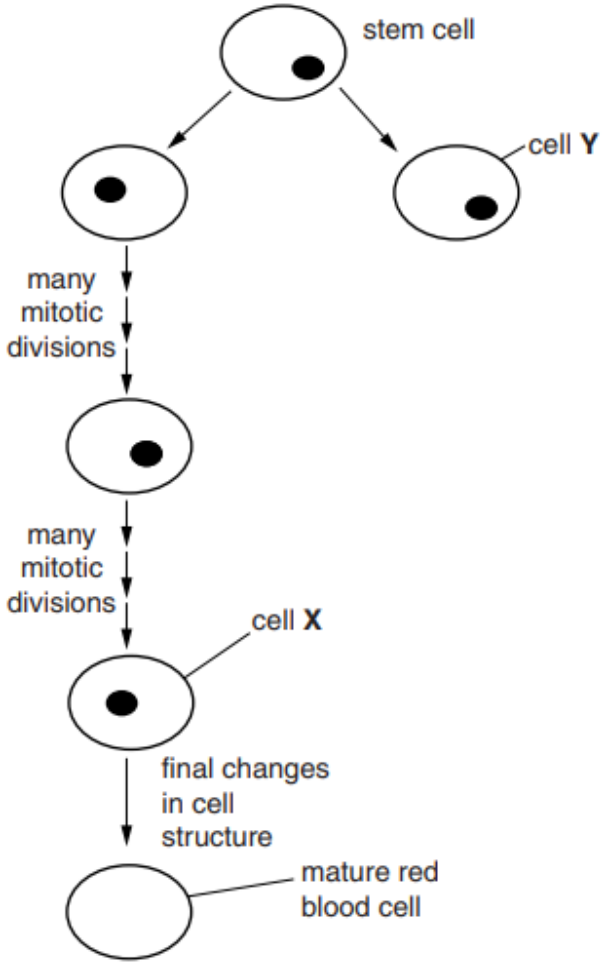
B Genes not required for the differentiation of a particular cell line are methylated.

C Binding of repressor molecules prevents the expression of genes not required for a particular cell line.

D Expression of gene not required for a particular cell line is controlled at translational level.

2018 / H2 / VJC PRELIM / P1 Q5

1 3 Bone marrow contains many stem cells. Some of these stem cells are responsible for the replacement of red blood cells. During the production of red blood cells, a series of changes occur to the cell structure. The figure below shows the production of a red blood cell from one of these stem cells.



Which of the following correctly describes the changes that occur as cell X becomes a mature biconcave red blood cell?

1. displays cell surface antigens such as ABO, CD4 and CD8
2. becomes multipotent
3. synthesises haemoglobin and carbonic anhydrase
4. loses its nucleus
5. loses organelles such as ribosomes, ER, mitochondria
6. loses telomerase activity

A 1, 2, 4, 6

B 2, 3, 4, 6

C 1, 3, 4, 5

D 3, 4, 5, 6

Stem Cells MCQ ANS			
Question	**Answer**	**Question**	**Answer**
1	**B**		
2	**D**		
3	**D**		
4	**B**		
5	**C**		
6	**A**		
7	**D**		
8	**D**		
9	**B**		
10	**B**		
11	**A**		
12	**B**		
13	**D**		