Stem Cells Comprehension **Questions**

1. What is a stem cell?

   Tick **one** box.

   - [ ] a differentiated cell which is specialised to carry out a function within an organism
   - [ ] an undifferentiated cell which can give rise to many more cells of the same type and from which specialised cells can arise through differentiation
   - [ ] an undifferentiated cell which can differentiate to form a specialised cell and can continue to differentiate into other cells throughout its entire existence

2. Place **one** tick (✓) in each row to show whether the statement describes adult stem cells or embryonic stem cells.

Statement	Adult Stem Cells	Embryonic Stem Cells
Found in human embryos.		
Found in bone marrow.		
Can differentiate into any cell type.		
Differentiation is restricted to a few cell types.		

3. Which type of disease are scientists already providing a treatment for with the use of stem cells?

   Tick **one** box.

   - [ ] Alzheimer's disease
   - [ ] anxiety
   - [ ] leukaemia
   - [ ] sepsis

4. Explain why the use of embryonic stem cells could make it possible to treat a wider range of diseases.

   _____

   _____

   _____

5. Explain what is meant by the term **rejection.**

6. Evaluate the use of adult stem cells and embryonic stem cells for therapeutic treatments.

Stem Cells Comprehension **Answers**

1. What is a stem cell?

   Tick **one** box.

   - [ ] a differentiated cell which is specialised to carry out a function within an organism
   - [x] **an undifferentiated cell which can give rise to many more cells of the same type and from which specialised cells can arise through differentiation**
   - [ ] an undifferentiated cell which can differentiate to form a specialised cell and can continue to differentiate into other cells throughout its entire existence

2. Place **one** tick (✓) in each row to show whether the statement describes adult stem cells or embryonic stem cells.

Statement	Adult Stem Cells	Embryonic Stem Cells
Found in human embryos.		✓
Found in bone marrow.	✓	
Can differentiate into any cell type.		✓
Differentiation is restricted to a few cell types.	✓	

3. Which type of disease are scientists already providing a treatment for with the use of stem cells?

   Tick **one** box.

   - [ ] Alzheimer's disease
   - [ ] anxiety
   - [x] **leukaemia**
   - [ ] sepsis

4. Explain why the use of embryonic stem cells could make it possible to treat a wider range of diseases.

   Embryonic stem cells can differentiate into any type of cell so they potentially can be used to treat many types of diseases and injuries.

5. Explain what is meant by the term **rejection.**

   Transplanted cells are identified as foreign and trigger an immune response in the host body, resulting in the stem cells being attacked and destroyed by white blood cells.

6. Evaluate the use of adult stem cells and embryonic stem cells for therapeutic treatments.

Level 3: There is a clear discussion of the use of different types of stem cells, with direct comparative statements made. The evaluation takes into consideration the practical implications, but also social and ethical points. The evaluation provides both advantages and disadvantages of the use of both types of stem cells, in a clearly balanced manner.
Level 2: There are several correct statements made, which attempt to discuss the use of adult stem cells in comparison to the use of embryonic stem cells. The evaluation provides both advantages and disadvantages of the use of both types of stem cells, but not necessarily in a balanced manner.
Level 1: There are simple statements about either adult stem cells, or embryonic stem cells. No comparisons or evaluation is given.
Indicative content: **Advantages of adult stem cells:** • less likely to be rejected when transferred to a patient • have proven success in clinical applications • no major ethical concerns **Disadvantages of adult stem cells:** • limited differentiation potential/can only differentiate into a few cell types • can only be cultured for short durations • difficult to locate/isolate • cannot be cultured on a mass scale • suitable bone marrow donors are difficult to find **Advantages of embryonic stem cells:** • can grow in cultures for a year or longer • successful culturing methods exist already • can differentiate to almost any cell type • studies help scientists learn about the process of development **Disadvantages of embryonic stem cells:** • process for developing cell lines (groups of cells) is inefficient • risk of rejection • require extensive testing to ensure safety and reliability • can lead to the development of tumours or cancers in patients • an embryo is destroyed to obtain the cells • wellbeing risks to embryo donors (physical, mental and emotional) • ethical concerns surrounding the rights of the embryo