

Stem cells

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Stem cells are undifferentiated or non-specialised cells that are able, through cell division, to renew themselves indefinitely (self-renewal). Crucially, they are also able, when provided with appropriate stimuli, to differentiate into one or more of the different types of specialised cell found in tissues and organs (potency). Because of their unique ability to undergo self-renewal when cultured in vitro and to be directed to differentiate into specialised cell types, they have enormous potential - for use as cell-based therapies or, by way of their different characteristics, to otherwise contribute to regenerative medicine. Stem cells can be classified in different ways, for example by using their characteristic level of potency such as pluripotent and multipotent (Figure 4.2) or with reference to the tissue from which they are derived, for example the early embryo

Lineage potential Capable of giving rise to all cell types of body and extraembryonic tissues
Capable of giving rise to all cell types of body Stem cell Reprogramming potency Capable of giving rise to all cell types of a particular tissue or organ Not capable of giving rise to other cell types

whether they are derived by reprogramming adult specialised cells to a pluripotent state (iPSCs).
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