# Stem Cells quiz answer sheet

**Q1: Which of the following cells can an iPSC turn into?**

*Induced Pluripotent Stem Cells (iPSCs) are pluripotent stem cells and can as such turn into any cell type. This is one of the characteristic traits of stem cells and makes them very useful for research purposes as they can develop into living cell types that are otherwise difficult to acquire from humans (such as neurons from the brain). Thanks to their pluripotency, iPSCs could be used in the future to recreate organs that wouldn’t be rejected by the host as it has the same genetic information.*

**Q2: What percentage of cells become iPSCs during reprogramming?**


*Reprogramming stem cells is still very inefficient, only 1 in 1000 (0.1%) adult cells successfully becomes an iPSC. The success rate is low because some cells reject triggers to start the reprogramming process and remain adult cells. Also in early stages during the process, if mistakes are made, the cell turns back into an adult cell instead of becoming an iPSC.*

**Q3: How can you start reprogramming?**


*There are different ways to start the reprogramming process; adding the specific proteins Oct4, Sox2, Klf4 and Myc (OSKM, known as the Yamanaka factors) to the cell, by exposing the cell to a specific combination of chemicals, or by changing the epigenetics inside the cell. The Yamanaka factors are the most conventional method to start the process. However, there is still a lot unknown regarding what exactly happens during the reprogramming process.*

**Q4: How many times can an iPSC divide?**


*Keeping iPSCs alive is a labour intense process for researchers and it requires to process the cells each day. However, when kept under the right conditions, iPSCs can divide indefinitely, which is one of the key characteristics of a stem cell.*

**Q5: Which of the following is an epigenetic mark?**


*Epigenetic marks are chemicals on top of the DNA that switch parts of the DNA, genes, on or off. DNA methylation is the addition of a methyl (CH3) group to the DNA that turns the genes off.*

**Q6: What happens to the biological age of cells after they are reprogrammed?**


*When adult cells are reprogrammed, they are converted to embryo-like stem cells. An embryo has the biological age of zero. As such, the biological age of the adult cells goes down to zero due to the reprogramming process.*