Kristen Erzsebet Koopmans
HL Biology

Comparison between the three different stem cell types; embryonic, cord blood and adult stem cells.

Stem cells			
	Embryonic	**Cord blood**	**Adult**
Sources	A zygote.	Blood found in the umbilical cord and placenta after birth.	Can be obtained from bone marrow, skeletal muscle, etc.
Is it easily obtained?	Can be easily obtained but the zygote has to die for that.	Easily obtained and stored. However, limited to the amount of stem cells in one baby's umbilical cord.	Difficult as very few of them can be found in addition to only being found deep in the tissues.
Ethics	An embryo is destroyed after cell extraction and thus some consider killing a human life, therefore has struck enormous debate. There is controversy in how to define a zygote. Is it considered a human life? Or, considered soulless and can feel no pain, so should be acceptable?	Parent's consent for the umbilical cord means that there is hardly any ethical dilemma here.	This is always extracted using patients consent so there is no dilemma here either.
Cell youth	Less likely to carry mutations so it is safer, due to being in the early stages of existence.	Although already part of a tissue, the cells have only reproduced a few times compared to adult stem cells and so there may only be a moderate amount of gene mutation.	More likely to have abnormalities and DNA mutations due to multiple causes. So not as safe as an embryonic stem cell.
Development potential	Greater differentiation potential than adult stem cells. They are able to develop into almost every type of cell in the body. They can be categorised as being pluripotent.	Limited differentiation potential. Can only naturally develop into blood cells, but research may lead to production of other types.	Smaller differentiation potential than embryonic stem cells because they already come from specialised tissues and so
Is it able to divide continuously?	Almost unlimited division.	Do not multiply as readily.	Do not multiply as readily.