

Fertility & Stem Cells

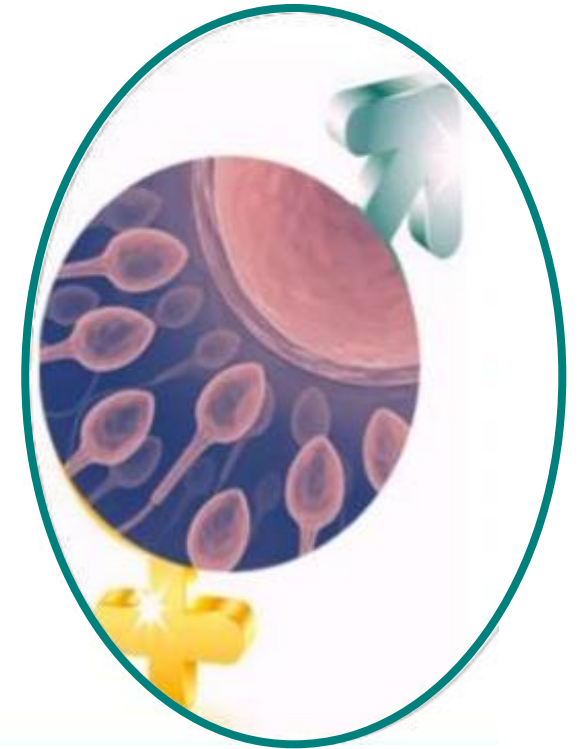


Transplantation of
germ line
Stem Cells
Restores **Fertility**

Er σ med
Urology & Reconstructive Clinic

Reproduction and Fertility: How could stem cells help?

For many who are unable to have a biological child, due to the absence of faulty eggs or sperm, stories about scientists making sperm or eggs from pluripotent stem cells in the lab has the potential to be a game changer.



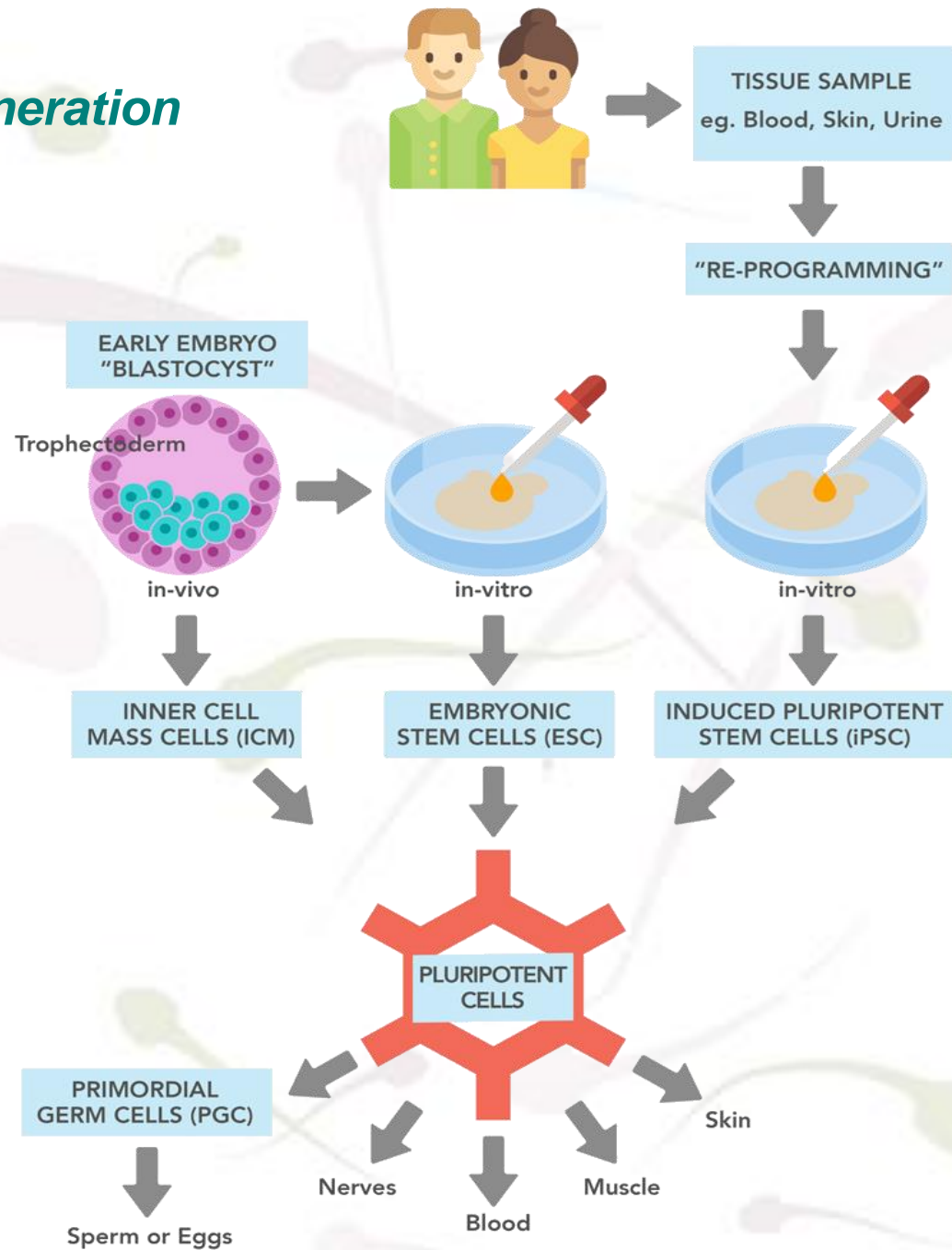
What are pluripotent stem cells?

Pluripotent cells turn into all of the types of cells that make up the body from muscle, nerve, skin cells, to eggs and sperm. Pluripotent cells are found as Inner Cell Mass (ICM) cells in 5 day old embryos - those used in in-vitro fertilization (IVF), but are quickly lost when the embryo implants and develops. Pluripotent cells cannot be found in fetuses or adults. When ICM pluripotent cells are grown outside the embryo in the lab, they are known as 'embryonic stem cells' (ESC). ESC were the first population of pluripotent stem cells (PSC) available to researchers, first derived from human embryos in 1998.

In 2006, researchers could make skin cells into Pluripotent Stem Cells, through a process known as 're-programming'. These cells resembled embryonic stem cells and were named adult derived induced pluripotent stem cells (iPSC). **These cells, like embryonic stem cells, have the potential to form all cell types of the body, including eggs and sperm.** The generation of induced pluripotent stem cells was revolutionary to the stem cell field and medicine as a whole and was awarded the Nobel Prize in 2012 only 5 years after they were successfully made from human cells . Induced pluripotent stem cells have now been made from many cell types in addition to skin - including blood , hair follicles and cells from urine !



Fig: iPSC v ESC generation



Can we make eggs and sperm from pluripotent stem cells?

Eggs and sperm have been made from mouse pluripotent stem cells leading to healthy, fertile pups from either PSC derived sperm or eggs.

Could we make eggs from male cells or sperm from female cells?

At the moment there is no evidence in mammals that sperm can be made from female cells or eggs from male cells.





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