

# EMBRYO . IVF . *Research Embryo* in vitro

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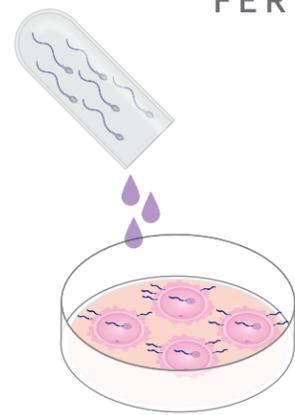
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## OOCYTE PROCUREMENT

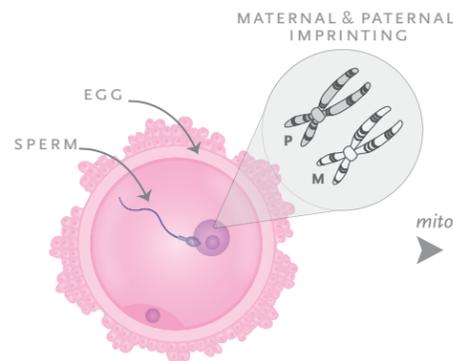
Hormones are injected into a person with ovaries who is not diagnosed with infertility and who is below the age of 30. Hormones induce the maturation of multiple oocytes (eggs) *in vivo*, which are then surgically removed. This process poses a risk of ovarian hyperstimulation syndrome (OHSS), with symptoms ranging from mild to severe and in rare cases can result in death. The full extent of health risks is unknown for this group of oocyte providers, as few research studies have been conducted on long-term health.

## IN VITRO FERTILIZATION



## OOCYTES & SPERM

**In Vitro Fertilization (IVF):** IVF is a technique used by scientists to create embryos in a Petri dish for research purposes. Sperm that have been screened for viral infection and washed are introduced to mature oocytes.



## ZYGOTES day 0

**Nuclear Fusion:** Fusion of egg and sperm provides a complete human genome (two sets of nuclear DNA). Upon fertilization, calcium ions flood the egg cytoplasm and trigger fusion of egg and sperm nuclei. The zygote (fused sperm and egg) is cultured in a Petri dish with growth factors and placed in an incubator that mimics the uterine environment.

## TOTIPOTENT cells



## BLASTOMERES day 3 8 cells

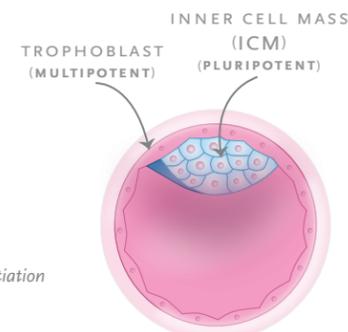


### Embryo Development and Screening:

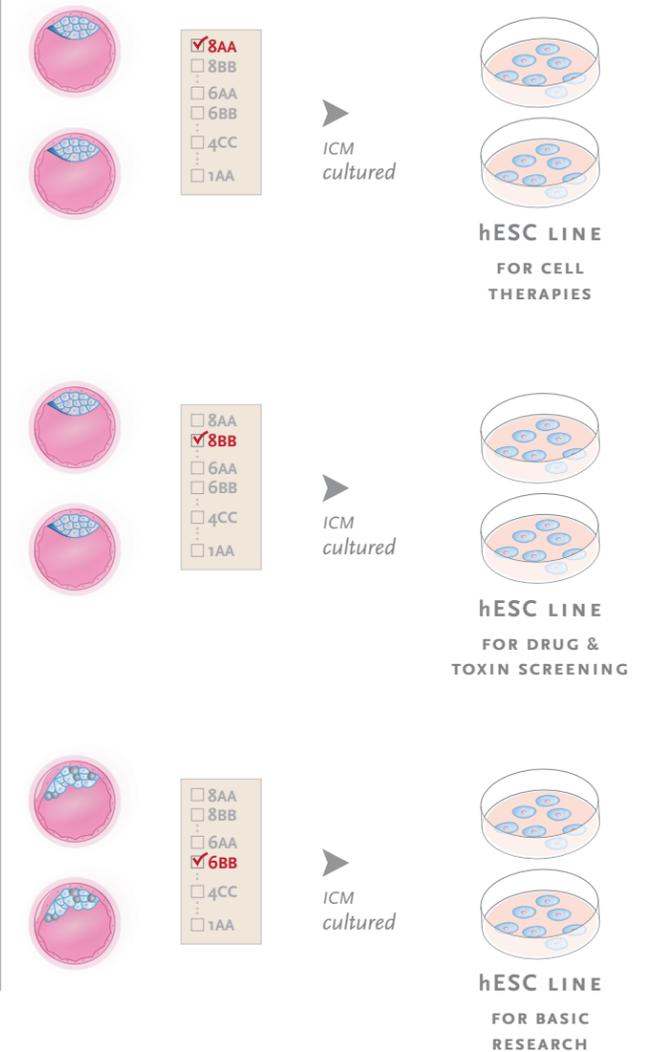
In response to cell culture conditions, the zygote undergoes mitotic cell division and at day 5 begins to differentiate.

With advances in microscopy and cell culture, an Embryoscope can be used to study human embryonic development in detail, allowing for selection of embryos best suited for stem cell line derivation. In addition, researchers have identified living cells in “dead” or in mitotically arrested embryos that can resume mitosis via scientific manipulation to create stem cell lines, but the small numbers present limitations.

## PLURIPOTENT & MULTIPOTENT cells



## BLASTOCYSTS day 5 ~150 cells



### Diverse Stem Cell Lines:

Pluripotent human embryonic stem cell lines (hESCs) are used to explore the effects of environmental toxins, to screen new drugs, and to develop cell transplant therapies. Because these oocyte providers are younger and not necessarily infertile, an increased number of viable embryos can generate cell lines representative of the diversity in the human population.