

In Vitro Fertilization
&
Designer Babies

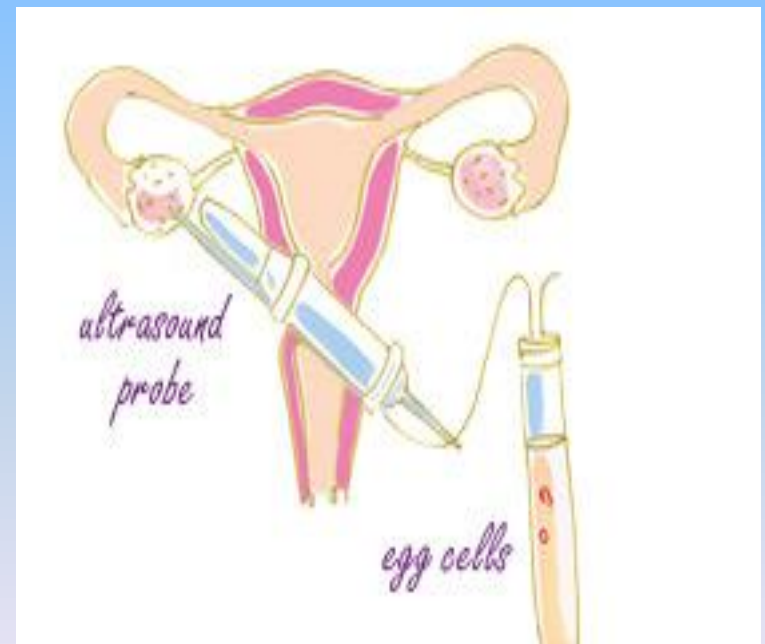
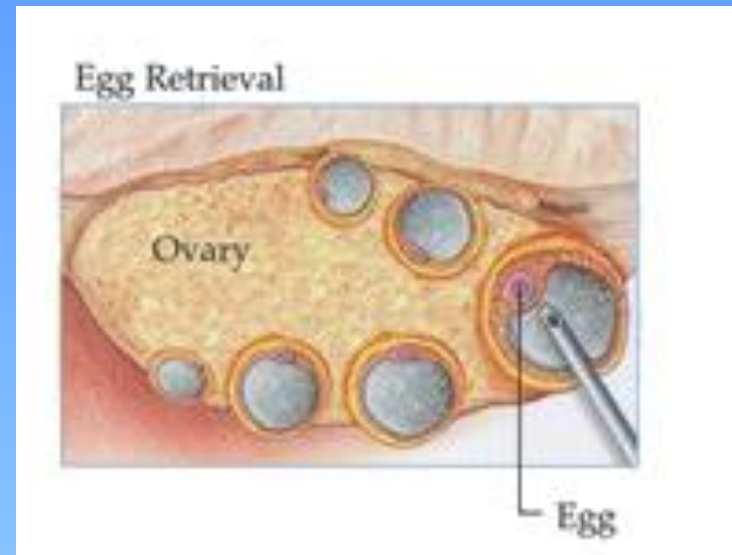
- **Step 1 – egg production**

- The female takes daily hormones to encourage healthy egg development.
- Doctors monitor hormone levels and egg development with blood testing and ultrasound imaging
- Once egg development has reached optimum levels, the patient is scheduled for egg retrieval

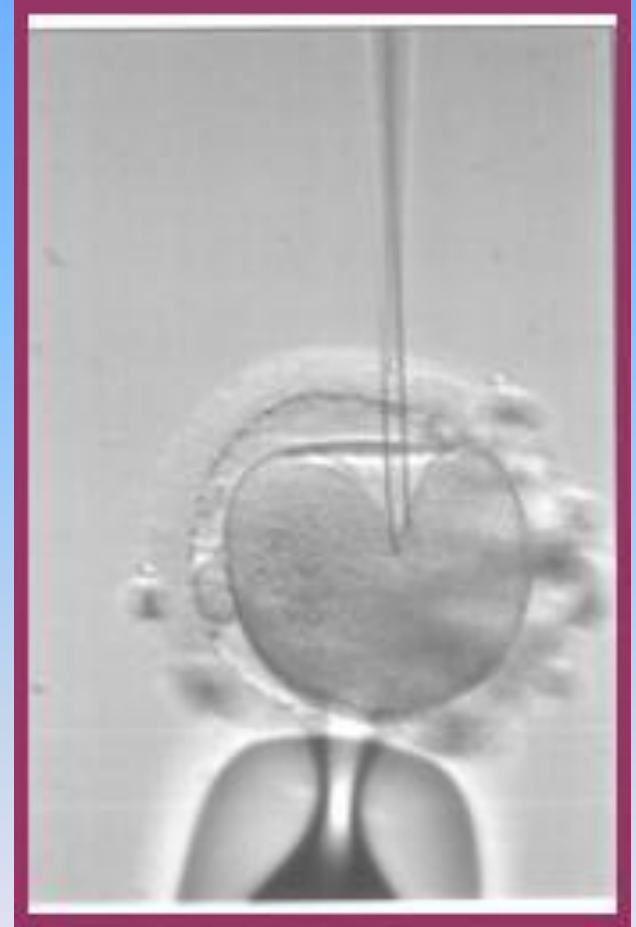


- **Step 2 – egg retrieval**

- Using ultrasound, doctors select the healthiest eggs for retrieval.
- Using a very thin needle, these eggs are removed from the follicles where they are produced
- Eggs placed in a petri dish inside an incubator which
- Incubator has a similar environment to the human body and will keep the eggs healthy and alive.



- **Step 3 – sperm retrieval and fertilization**
 - A sperm sample is gathered from the male and examined under a microscope for health.
 - If sample is healthy: 50,000-100,000 are added to the petri dish to fertilize the harvested eggs
 - If the sample lacks enough healthy sperm: doctors select healthiest and inject them directly into the harvested eggs.



Direct injection of sperm cells into harvested egg

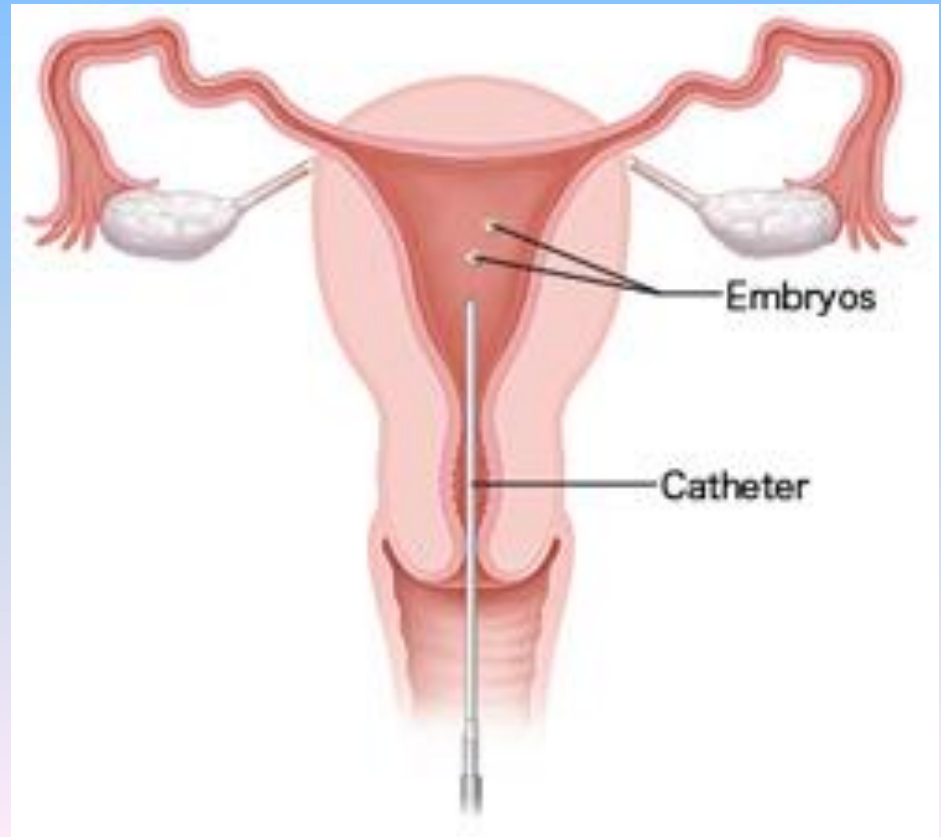
- **Step 4 – checking fertilization and development**

- Fertilized eggs are examined after 16-20 hours to check progress
- Healthy embryos continue to grow in the incubator for another 3-6 days

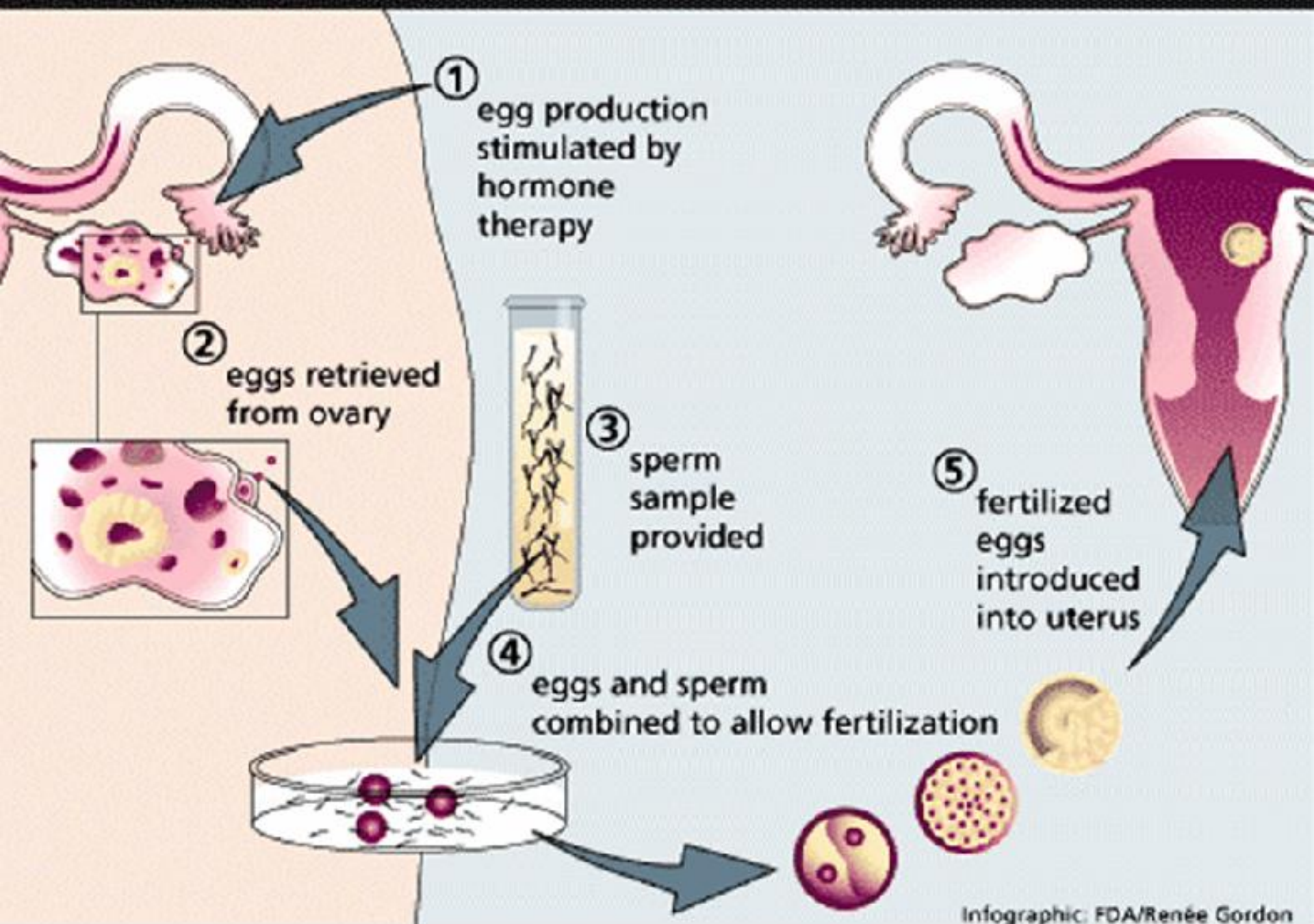


- **Step 5 – implantation**

- The healthiest embryos are implanted using a catheter (a narrow, hollow tube) that is inserted through the cervix



In Vitro Fertilization



Additional IVF procedures

- Sex Selection
 - Embryo can be tested to see if it is male or female
 - Parents will sometimes choose to only implant embryos of a particular sex

Additional IVF procedures

- Pre-implantation Genetic Diagnosis (PGD)
 - In some cases, a complete genetic analysis is conducted before embryos are implanted in the uterus. This could be due to medical conditions of the mother, family history of genetic diseases, or simply the wishes of the parents
 - There are over 50 genetic disorders that can be identified using PGD

How PGD works

- **Step 1.** Undergo normal IVF treatment to collect and fertilize your eggs.
- **Step 2.** Embryo is grown in the lab for two - three days until the cells have divided and consists of around eight cells.
- **Step 3.** A trained embryologist removes one or two of the cells from the embryo.
- **Step 4.** The cells are tested to see if the embryo contains the gene that causes the genetic condition in the family.
 - Polar bodies present in female embryos so they can be selected for
 - Analyze DNA sequence in sections of DNA that code for conditions in a single gene
 - Other technologies allow for detection of extra or missing chromosomes
- **Step 5.** Embryos unaffected by the condition are transferred to the womb to allow them to develop.