IN-VITRO FERTILIZATION AND EMBRYO TRANSFER

By

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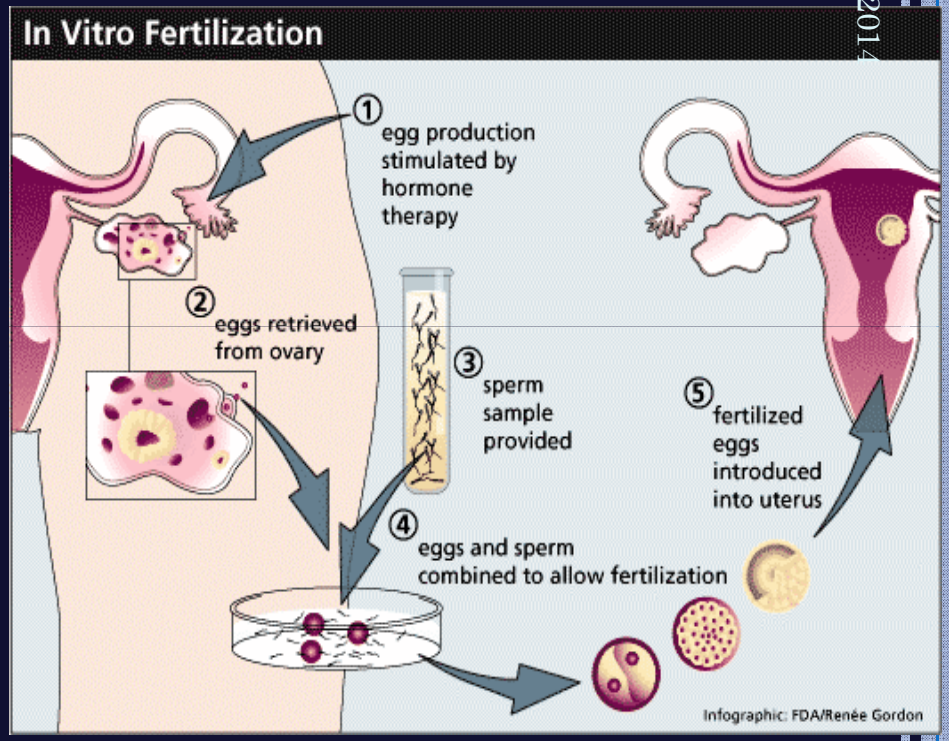
INTRODUCTION

- In vitro fertilisation (IVF) is a process by which an egg is fertilised by sperm outside the body: in vitro. IVF is a major treatment for infertility when other methods of assisted reproductive technology have failed.
- The first successful birth of a "test tube baby", Louise Brown, occurred in 1978. Louise Brown was born as a result of natural cycle IVF where no stimulation was made.
- Robert G. Edwards, the physiologist who developed the treatment, was awarded the Nobel Prize in Physiology or Medicine in 2010.

Process outline

- The process involves monitoring and stimulating a woman's ovulatory process, removing ovum or ova (egg or eggs) from the woman's ovaries and letting sperm fertilize them in a fluid medium in a laboratory.
- The fertilized egg (zygote) cultured for 2–6 days in a growth medium and is then transferred to the mother's uterus with the intention of establishing a successful pregnancy.



WHY NEED OF IN-VITRO FERTILIZATION

- **Fallopian tube damage or blockage.** Fallopian tube damage or blockage makes it difficult for an egg to be fertilized or for an embryo to travel to the uterus.
- **Ovulation disorders.** If ovulation is infrequent or absent, fewer eggs are available for fertilization.
- **Premature ovarian failure.** Premature ovarian failure is the loss of normal ovarian function before age 40. If your ovaries fail, they don't produce normal amounts of the hormone estrogen or have eggs to release regularly.
- **Endometriosis.** Endometriosis occurs when the uterine tissue implants and grows outside of the uterus — often affecting the function of the ovaries, uterus and fallopian tubes.
- **Uterine fibroids.** Fibroids are benign tumors in the wall of the uterus and are common in women in their 30s and 40s. Fibroids can interfere with implantation of the fertilized egg.

There are five basic steps to IVF

- Step 1: Stimulation, also called super ovulation

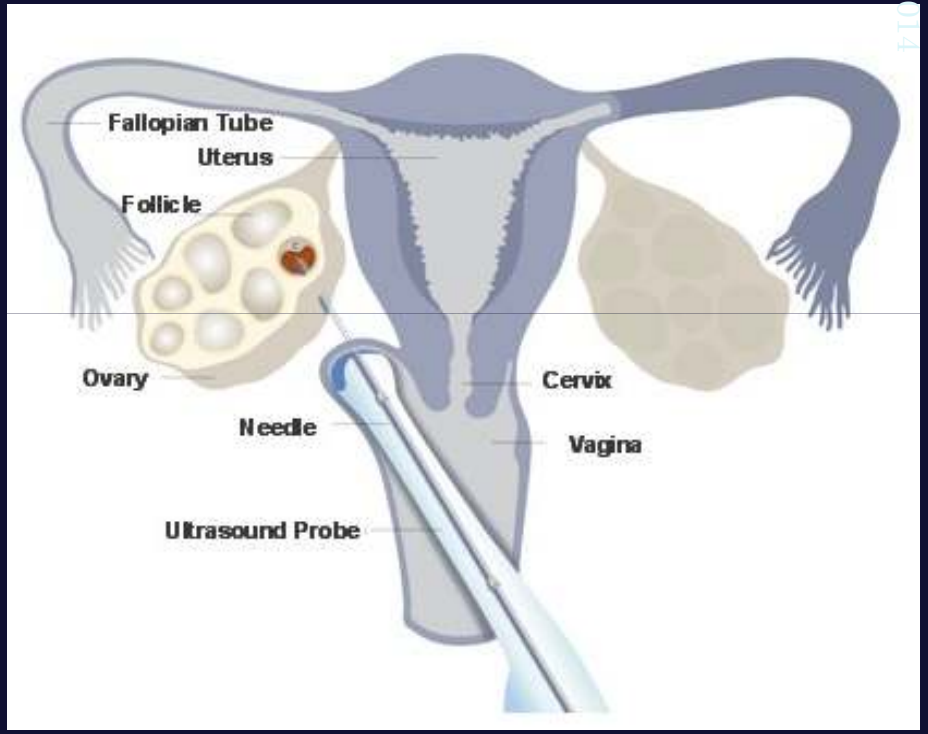
  Medicines, commonly called fertility drugs, are given to the woman to boost her egg production. Normally, a woman produces one egg per month. Fertility drugs tell the ovaries to produce several eggs.

  During this step, the woman will have regular transvaginal ultrasounds to examine the ovaries and blood tests to check hormone levels.

  Prostagladin F_{2a}, Follical stimulating Hormone (FSH) stimulate ovulation.

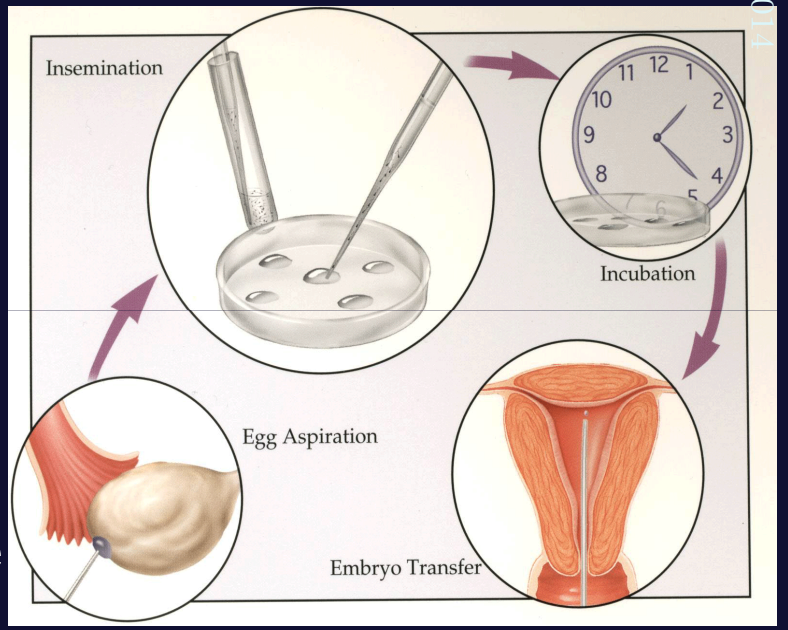
Step 2: Egg retrieval

- Egg retrieval is done by follicular aspiration to remove the eggs from the woman's body using ultrasound guide.
- The needle is connected to a suction device, which pulls the eggs and fluid out of each follicle, one at a time. The procedure is repeated for the other ovary.



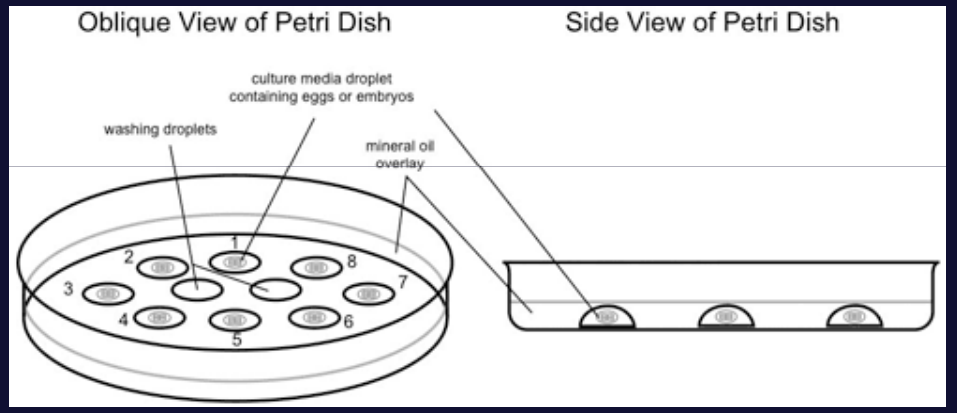
Step 3: Insemination and Fertilization

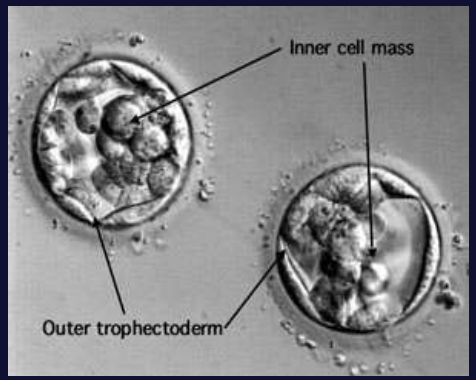
- The man's sperm is placed together with the best quality eggs and stored in an environmentally controlled chamber.
- The mixing of the sperm and egg is called insemination. The sperm usually enters (fertilizes) an egg a few hours after insemination.
- If the doctor thinks the chance of fertilization is low, the laboratory staff may directly inject the sperm into the egg. This is called intracytoplasmic sperm injection (ICSI).



Step 4: Embryo culture

- When the fertilized egg divides, it becomes an embryo.
- IVF egg must be maintain for few days –
  - 7 days – Sheep, Goat
  - 8 days – for cattle
- This allow egg to blastocysts
- Single cell may remove from embryo and screen the material for specific genetic disorders.





Step 5: Embryo transfer

- Embryos are placed into the woman's womb 3 - 5 days after egg retrieval and fertilization.
- Embryo transfer done using thin tube (catheter) containing the embryos into womb of female.
- More than one embryo may be placed into the womb at the same time, which can lead to twins, triplets, or more.
- Unused embryos may be frozen and implanted or donated at a later date.

To overcome these problems -

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Thank you