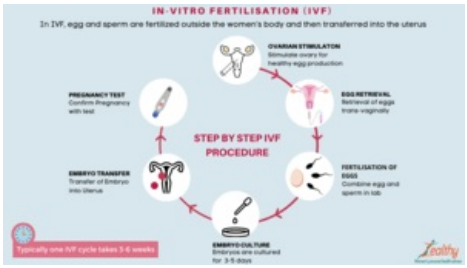
In vitro fertilization

- **In vitro fertilization (IVF)** is one method of assisted reproduction (see assisted reproduction). It is also known by the wider lay public as "test tube babies". However, the test tube has little to do with the method, as the embryos are cultured in Petri dishes. Insemination oocyte therefore takes place in laboratory conditions.
- **Indication** for undergoing IVF in this way is usually one of two reasons: inability to conceive naturally or interest in a method called preimplantation genetic diagnosis.

IVF procedure

By administering hormones the patient's ovaries are stimulated , so that more oocytes mature in them at the same time. These are then removed from the ovaries by biopsy and fertilized outside the mother's body - in an embryology laboratory. During the collection, the woman is under general anesthesia. The collection takes about 15-20 minutes and is performed on an outpatient basis. After the procedure, the woman rests in bed for two hours, and if everything is fine, she can then go home.



in vitro fertilization

Preparing the egg for fertilization

- The two most common ways to prepare an egg:

1. The oocyte can only be mixed with sperms in a Petri dish and the moment of fertilization is left to "nature" (the first option).
2. **Using intracytoplasmic sperm injection (ICSI),** the embryologist inserts one sperm directly into the prepared egg.
    - This requires **an inverted microscope with a micromanipulator**, which includes two special pipettes: **a holding pipette** and an **ICSI pipette.** A laser is usually part of such a microscope and is also used for assisted hatching. Sperm are obtained by masturbation or by the **MESA** or **TESE** methods - taken directly from the testicles (TESE) or epididymis (MESA). This procedure is performed by a urologist.

Embryo culture

- Cultivation takes place for 3 days (longer in the case of prolonged cultivation) in the laboratory in inkubators/cultivators (temperature 37 °C, correct concentration of O 2 and CO 2).
- Embryos are checked daily or continuously monitored by camera and their development is recorded.

Implantation of embryo

- Back in the mother's body on the 3rd day (4th, 5th) the best developing embryos, or embryos that are not expected to have a hereditary disease (preimplantation genetic diagnosis) are inserted into the mother's uterus.
- The procedure in which a tube with an embryo is inserted through the cervix is not painful for the patient.
- The number of embryos that are transferred depends on the mother's age and possibly her health. Mostly it is 1, sometimes 2 embryos. As a rule, the remaining embryos are preserved by freezing or vitrification (cryopreservation) and, if they are not used for transfer in the future, they can be donated under the conditions established by law for scientific purposes.

Other methods related to IVF

Assisted hatching (AH)

- During assisted hatching , the zona pellucida of the developing embryo is gently disturbed. This ensures a greater probability of successful implantation. It can be disturbed mechanically, chemically or most often with a laser. The procedure is performed at the patient's request.

Cultivation Extension (PK)

- In the case of PK, it is possible to select better embryos for a longer period of time. This method is also used in the case of preimplantion genetic diagnosis. The embryos are then inserted into the uterus at a stage as if they had gotten there from ovary naturally through fallopian tube.

Cryopreservation x thawing

- Sperm and embryos can be frozen and, if necessary, thawed and used. They are preserved in liquid nitrogen and this method is called cryopreservation. Eggs cannot be stored this way.

Preimplantation genetic diagnosis (PGD)

- This method enables genetic testing of the egg (polar body) or embryo before implantation in the uterus.

Links

Related Articles

- Preimplantation genetic diagnosis
- Assisted reproduction
- The first week of embryonic development

references

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- MRÁZEK, Milan. *Umělé oplodnění. I.* 1. edition. Praha : Triton, 2003. ISBN 80-7254-413-6.