

# In-Vitro Fertilization

In vitro fertilization, referred to as IVF, is the process of fertilization by manually combining an egg and sperm in a laboratory dish. When the IVF procedure is successful, the process is combined with a procedure known as embryo transfer, to physically place the embryo in a woman's uterus. Five basic steps complete the IVF and embryo transfer process:

1. Monitor and stimulate the development of healthy egg(s) in the ovaries
2. Collect the eggs
3. Collect the sperm
4. Combine the eggs and sperm together in the laboratory and provide the appropriate environment for fertilization and early embryo growth
5. Transfer embryos into the uterus

**Step 1:** Fertility medications are prescribed to control the timing of an egg's ripening and increase the chance of collecting multiple eggs during a woman's menstrual cycle. This is often referred to as ovulation induction. Multiple eggs are desired because some eggs do not develop or fertilize after collection. Egg development is monitored using ultrasound.

**Step 2:** A woman's eggs are retrieved through a minor surgical procedure that uses ultrasound imaging to guide a hollow needle through the pelvic cavity. Sedation and local anesthesia are provided to alleviate any discomfort. Eggs are removed from the ovaries using the hollow needle, a process called follicular aspiration.

**Step 3:** Sperm, usually obtained by ejaculation, is prepared for combining with the eggs.

**Step 4:** In a process called insemination, the sperm and eggs are placed in laboratory incubators to enable fertilization to occur. In some cases in which the chance of fertilization is suspected to be low, intracytoplasmic sperm injection (ICSI) may be used. In this procedure, a single sperm is injected directly into the egg in an attempt to achieve fertilization. The eggs are monitored to confirm that fertilization and cell division are taking place, at which point the fertilized eggs are considered embryos.

**Step 5:** Embryos are transferred into the woman's uterus anywhere between 1-6 days (most commonly 2-3 days) after egg collection. At this point, the fertilized egg has divided to become a two- to four-cell embryo. A predetermined number of embryos are suspended in fluid and gently placed through a catheter into the womb, a process often guided by ultrasound. The procedure is usually painless, but some women experience mild cramping.

These steps are followed by rest and watching for early pregnancy symptoms. A blood test and an ultrasound are used to determine if implantation and pregnancy has occurred.

The success rate at IVF clinics depends on a number of factors including patient characteristics and treatment approaches. It is also important to realize that pregnancy rates do not equate to live birth rates. In the U.S., the live birth rate for each IVF cycle started is approximately:

- 30 to 35% for women under age 35
- 25% for women aged 35 to 37
- 15 to 20% for women aged 38 to 40
- 6 to 10% for women over 40

When comparing the success rates of different clinics, it is important to know what type of pregnancy is being compared. A biochemical pregnancy is one confirmed by blood or urine tests, but a miscarriage may occur before confirmation through an ultrasound. A clinical pregnancy is one witnessed through ultrasound. A miscarriage may still occur with a clinical pregnancy, but it is still important to understand the difference. Only comparisons between rates of the same type of pregnancy are valid.

IVF may be conducted with a couple's own eggs and sperm or with donor eggs, sperm or embryos. Some couples choose to use donor eggs, sperm or embryos because of genetic concerns. Donor eggs are used in approximately 10% of all assisted reproductive technology (ART) cycles.

The potential risks of the IVF medical procedure depend upon each specific step of the procedure. Furthermore, the chance of a multiples pregnancy (such as twins, triplets or more) is increased in all ART procedures. Additional risks and concerns may arise due to multiples during pregnancy, such as increased risk of premature delivery.

The number of embryos that should be created or transferred during any single IVF cycle is open to debate. Medical literature indicates that transferring four or fewer embryos per IVF cycle yields optimal results. Transferring more than four is believed to result in excess numbers of multiple pregnancies, which increases the possibility of other complications. Transferring four embryos vs. one or two increases the probability that pregnancy will occur, but it is important to realize that all four embryos could implant.

**Your tasks for this activity are:**

- Review the vocabulary handout to familiarize yourself with any unknown vocabulary words used in this description of in-vitro fertilization.
- Decide how to communicate this information to your class in an effective way. You may include all information or only the relevant highlights from what you learned in this handout.
- In your presentation, communicate the advantages and disadvantages of this technology. You will want to discuss this as a group. Mention your suggestions for further improvements to the technology.
- Your presentation must include at least one visual element (more than just reading / lecturing to the class), such as a drawing, graphic, picture, table, graph, chart, skit, song, poem, demo.

**Source:** In-Vitro Fertilization: IVF. Updated May 2007. American Pregnancy Association. Accessed February 17, 2009. <http://www.americanpregnancy.org/infertility/ivf.html>