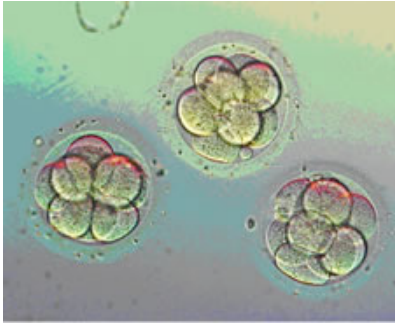




## *In Vitro Fertilization: IVF*



In Vitro Fertilization is commonly referred to as IVF. 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**, which is used to physically place the embryo in the uterus.

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### **What is involved with in vitro fertilization?**

There are basically five steps in the IVF and embryo transfer process which include the following:

1. Monitor and stimulate the development of healthy egg(s) in the ovaries.
2. Collect the eggs.
3. Secure 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 the egg ripening and to increase the chance of collecting multiple eggs during one of the woman's cycles. This is often referred to as *ovulation induction*. Multiple eggs are desired because some eggs will not develop or fertilize after retrieval. Egg development is monitored using ultrasound to examine the ovaries and urine or blood test samples to check hormone levels.

**Step 2:** Your eggs are retrieved through a minor surgical procedure which uses ultrasound imaging to guide a hollow needle through the pelvic cavity. Sedation and local anesthesia are provided to remove any discomfort that you might experience. The eggs are removed from the ovaries using the hollow needle, which is called *follicular aspiration*. Some women may experience cramping on the day of retrieval, which usually subsides the following day; however, a feeling of fullness or pressure may last for several weeks following the procedure.

**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 incubators located in the laboratory which enables fertilization to occur. In some cases where fertilization is suspected to be low, **intracytoplasmic sperm injection (ICSI)** may be used. Through 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. Once this occurs, the fertilized eggs are considered embryos.

**Step 5:** The embryos are usually transferred into the woman's uterus anywhere from one to six days later, but most commonly it occurs between two to three days following egg retrieval. At this point, the fertilized egg has divided to become a two-to-four cell embryo. The transfer process involves a speculum which is inserted into the vagina to expose the cervix. A predetermined number of embryos are suspended in fluid and gently placed through a catheter into the womb. This process is 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 potentially an ultrasound will be used to determine if implantation and pregnancy has occurred.

### **Are there variations of in vitro fertilization?**

**Gamete intrafallopian transfer (GIFT)** and **zygote intrafallopian transfer (ZIFT)** are two procedures related to IVF.

GIFT is similar to IVF, but the gametes (egg and sperm) are transferred to the fallopian tubes rather than the uterus, and fertilization takes place in the tubes rather than in the laboratory. GIFT also involves a laparoscopic surgical procedure to transfer the sperm and egg into the tubes. GIFT accounts for approximately 2% of assisted reproductive technology (ART) procedures in the United States.

ZIFT differs from GIFT in that the fertilization process still takes place in the laboratory versus the fallopian tubes. It is similar to GIFT in that the fertilized egg is transferred into fallopian tubes, and it involves a laparoscopic surgical procedure. ZIFT accounts for less than 1.5% of assisted reproductive technology (ART) procedures in the United States.

### **How successful is in vitro fertilization?**

The success rate of 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 United States, the live birth rate for each IVF cycle started is approximately:

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

The success rates of individual clinics are published on the web site of the **Centers for Disease Control and Prevention**.

When comparing success rates of different clinics, it is important to know what type of

pregnancies are being compared. A chemical pregnancy is one confirmed by blood or urine tests, but a **miscarriage** may occur before confirmation through an ultrasound. A clinical pregnancy is one verified by ultrasound. After a clinical pregnancy has been verified, a miscarriage may still occur, but it is less likely.

### **What if I don't produce healthy eggs or my husband is sterile?**

IVF may be done 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.

### **What are the risks associated with in vitro fertilization?**

As with most medical procedures, there are some potential risks. The risks of in vitro fertilization depend upon each specific step of the procedure.

Ovary stimulation carries the risk of hyperstimulation, where the ovaries become swollen and painful. This condition, "Ovarian Hyper stimulation Syndrome", is usually rare, mild, and involves the following potential side effects: nausea, vomiting, lack of appetite, or a feeling of being bloated. More severe symptoms which occur in 1% of cases, include the following:

- Severe abdominal pain
- Severe nausea or vomiting
- Decreased urinary frequency
- Dark-colored urine
- Shortness of breath
- Ten pound weight gain within three to five days

Egg retrieval and the use of laparoscopy carry the typical risks related to anesthesia. Additionally, there is a slight risk of bleeding, infection, and damage to the bowel, bladder, or a blood vessel. Less than one patient in 1,000 will require surgery to repair damage caused during the egg retrieval process.

The chance of a multiples pregnancy is increased in all assisted reproductive procedures. There are additional risks and concerns related to multiples during pregnancy such as increased risk of premature delivery.

Assisted reproductive technology (ART) involves a significant physical, financial, and emotional commitment on the part of the couple. Psychological stress and emotional problems are common, and even more so if IVF is unsuccessful.

### **How many embryos should be created or transferred?**

The number of embryos that should be created or transferred during any single IVF cycle is open to debate. It has been said in the medical literature that transferring no more than four embryos per IVF cycle will yield 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 versus one or two increases the probability that pregnancy will occur, but it is important to realize that all four embryos could implant. Some people have concerns regarding what happens to leftover embryos, so this would be something that the

couple would want to thoroughly discuss with their physician.

### **Find an Infertility Specialist in Your Area**

#### **How do I choose an infertility clinic?**

There are several things to investigate regarding the cost and details related to specific centers and fertility programs. We have provided some questions that may be helpful to ask when choosing a clinic: [Selecting Your ART Program](#).

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