

California Fertility Partners

In Vitro Fertilization (IVF)

IVF is an assisted reproductive technique that is used to treat infertility due to multiple etiologies including tubal disease, male factor, endometriosis, and unexplained causes. The treatment involves stimulation of the ovaries to produce multiple eggs, removal of the eggs by an ultrasound directed needle aspiration, followed by insemination of the eggs in the laboratory. The fertilized eggs, or embryos, are grown in culture for 3-5 days before being transferred into the uterine cavity.

A woman's natural cycle is self-regulated to produce one egg per month. The eggs develop within fluid-filled sacs inside the ovaries, called follicles. The hormone that is released by the pituitary to stimulate the follicles to grow each month is called follicle stimulating hormone, or FSH. By giving daily injections of medications containing FSH we can increase the blood level of this hormone, causing several follicles to develop to maturity.

There are several different types of medications used to prepare the ovaries for an IVF aspiration. Lupron and Ganirelix are used to prevent the surge of LH in mid-cycle and thereby prevent ovulation. Preparations containing FSH include: Gonal F, Follistim, Bravelle, and Menopur. These medications are used to stimulate multiple follicle growth.

Careful monitoring of the ovaries during treatment is essential for the development of high quality eggs as well as patient safety. Serial ultrasounds and blood tests are used to evaluate the ovarian response and timing of egg recovery. The sizes of the follicles correlate with maturity of the egg inside. When the eggs reach predicted maturity, an ultrasound guided aspiration procedure is scheduled to harvest the eggs.

The egg retrieval is a simple outpatient surgical procedure that is performed under intravenous anesthesia. A vaginal ultrasound probe is used to guide a needle through the vaginal wall and into the ovary. Once the needle is inside the follicle, suction is used to aspirate the fluid and egg into a test tube. The embryologist then examines the fluid for the presence of an egg. The entire procedure takes approximately twenty minutes to perform.

Our embryologist then mixes the eggs with sperm or assists fertilization by sperm injection (ICSI). The embryos are then cultured in a tightly controlled laboratory environment for 3-5 days. Extra embryos may be frozen and stored until a later time. The number of embryos transferred into the uterus is determined based on the woman's age. The number transferred will range from 1 to 6 embryos. A blood test twelve days following embryo transfer later will diagnose pregnancy.

Embryo Freezing

Some women are fortunate enough to have sufficient eggs and embryos from one egg retrieval procedure to allow the extra embryos to be frozen and stored for future use. Any remaining good quality embryos that are not transferred in the fresh cycle may be frozen. The frozen embryos may be stored for an indefinite time period. When needed, the embryos are thawed and transferred into a hormonally prepared uterus. This allows the patient to limit the number of embryos to be transferred in any give fresh transfer cycle, and keeping the unused embryos for future pregnancy attempts.

Assisted Hatching

A developing embryo must break free of its shell before it can attach to the uterine wall. As the embryo develops in culture, the cells of the embryo secrete enzymes that degrade the thickness of the cell's protective coating, the zona pellucida. Some embryos in the laboratory are deficient in the enzymes needed



to begin this zona-thinning process. In addition, some embryos grown in the laboratory may have a harder shell than normal.

Assisted hatching is a technique that is used to assist the natural hatching process. In this procedure, the embryologist directs a small amount of dilute acid to the embryo's outer coating, to initiate the thinning process. This procedure is most beneficial for women over the age of 38, women with mild elevation of their FSH levels, women with multiple failed IVF cycles, in women with unusually thick zona pellucidae, and in frozen embryo cycles.

IVF Stimulation Protocols

There are two general types of protocols used to stimulate the ovaries for IVF: Lupron down-regulation (long protocol) and GnRH antagonist (short protocol). The goal of both approaches is to stimulate the ovaries to produce multiple eggs in synchrony, instead of the single egg that is developed in a natural ovarian cycle. Both Lupron and the GnRH antagonists also serve to prevent a mid-cycle LH surge and spontaneous ovulation of the eggs.

Lupron is a medication that is used to temporarily turn-off the natural menstrual cycle by shutting down the release of FSH and LH by the pituitary gland. It is given as a subcutaneous injection in the thigh or abdomen. After 7-10 days of treatment, the release of pituitary hormones is suppressed, menstrual flow begins, and the ovaries remain in a holding pattern until stimulating hormones are initiated. Lupron may be started eight days after ovulation, or after taking six or more days of oral contraceptive pills. After menstrual begins, we perform an ultrasound exam of the ovaries to check the size and number of basal antral follicles and to ascertain that no cysts are present, and perform hormone assays for estrogen and progesterone to confirm that the ovaries are suppressed. The next step is to initiate ovarian stimulation with daily subcutaneous injections of FSH and LH.

There are several different commercial preparations of FSH and FSH/LH available. These hormones act directly on the ovaries to stimulate follicle development. There is one egg per follicle. As the ovaries respond the follicles enlarge and produce increasing amounts of estrogen in direct proportion to the number of growing follicles. Patients come in for ultrasound exams and hormone assays every few days to safely monitor follicle development. After 8-12 days of ovarian stimulation, the eggs reach maturity and the egg retrieval is scheduled. An injection of hCG is given 34 hours prior to the surgery time to cause the final maturation of the eggs.

The GnRH antagonist (short protocol) begins with an ultrasound exam and hormone assays on the second day of menses. If the exams are normal, FSH/LH injections are started that same day. Once the follicles reach mid-way in their development, a daily injection of antagonist hormone is given to prevent the mid-cycle LH surge, which would trigger a spontaneous ovulation. HCG is given when the lead follicles reach the appropriate size and the estrogen level is consistent with follicle maturity.

Prior to beginning either protocol all patients complete infectious disease screening labs (state law), genetic screening tests as recommended by their physician, and any additional pre-treatment testing outlined by their physician.

