

Gonadotropin injections: how they work and risks of ovarian stimulation



What are gonadotropin injections?

Gonadotropins are hormones that normally come from the pituitary gland and regulate ovarian function. The two central hormones are follicle-stimulating hormone, or FSH, and luteinizing hormone, or LH. In a natural menstrual cycle, FSH supports early follicle recruitment and growth, while LH contributes to steroid hormone production and, later, the ovulatory signal. Injectable fertility medications use these hormonal pathways therapeutically.

Fertility gonadotropin preparations may contain FSH alone, a combination of FSH and LH activity, or related products used as part of a stimulation regimen. Unlike oral medications such as clomiphene citrate or letrozole, which work indirectly by changing hypothalamic-pituitary signaling, injectable gonadotropins act more directly on the ovary. This direct stimulation is why they can be highly effective, but also why monitoring is essential.

In clinical practice, gonadotropin injections may be used for people with absent or irregular ovulation, unexplained infertility, fertility treatment with intrauterine insemination, or controlled ovarian stimulation for IVF. The aim is not always the same. In some non-IVF cycles, the goal may be one or a small number of mature follicles. In IVF, the goal is often to mature multiple

follicles so that several oocytes can be retrieved.

How gonadotropins stimulate the ovaries

Each ovarian follicle contains an oocyte surrounded by hormone-responsive cells. FSH promotes granulosa cell proliferation and supports follicular growth. As follicles enlarge, they produce estradiol, which gives clinicians a biochemical signal of ovarian activity. LH activity supports theca-cell androgen production, which granulosa cells can convert into estrogens; in some protocols, LH activity may be clinically relevant, especially when endogenous LH is low or suppressed.

During stimulation, daily or near-daily injections are typically given for several days. The ovaries are followed with transvaginal ultrasound to measure follicle number and diameter, and blood tests may be used to measure estradiol and other hormones. This monitoring is not simply procedural; it is central to balancing effectiveness with safety. Too little stimulation may fail to produce an adequate follicular response, while too much stimulation can increase the risk of ovarian hyperstimulation syndrome and multiple follicles capable of ovulation.

When one or more follicles reach an appropriate size and hormonal context, clinicians may use a trigger injection. Human chorionic gonadotropin, or hCG, can mimic LH-like activity and help induce final oocyte maturation and ovulation. In IVF protocols, the trigger helps time egg retrieval. In some high-response situations, clinicians may choose alternative trigger strategies to reduce the risk of ovarian hyperstimulation syndrome.

What a monitored stimulation cycle may involve

Specific protocols vary widely, and dosing should be individualized by a fertility specialist. However, many cycles share several elements: baseline assessment, ovarian stimulation, monitoring, trigger planning, and luteal-phase or pregnancy follow-up.

Baseline evaluation: A clinician may review menstrual history, ultrasound findings, ovarian reserve markers, prior treatment response, partner or sperm factors, and pregnancy risks.

Medication teaching: Patients are usually shown how to prepare and inject the medication, where to inject it, and how to store supplies safely.

Serial monitoring: Ultrasound and bloodwork help estimate follicle growth and hormonal response. Appointments may become more frequent as follicles mature.

Cycle decisions: Depending on the response, the care team may adjust the dose, continue monitoring, administer a trigger, convert the plan, freeze embryos in IVF, or cancel a cycle if risk is too high.

Post-trigger care: Timing of intercourse, insemination, or egg retrieval is coordinated around expected ovulation or oocyte maturation.

For patients, this can be emotionally demanding. The schedule may disrupt work, childcare, travel, and sleep. It is reasonable to ask the clinic in advance how often visits typically occur, what after-hours symptoms require a call, and how cycle cancellation decisions are made.

Who may respond strongly or weakly?

Ovarian response to gonadotropins is variable. Some patients develop only one or two follicles despite substantial dosing, while others develop many follicles at low doses. Age, anti-Müllerian hormone, antral follicle count, body weight, polycystic ovary syndrome, prior ovarian surgery, endometriosis, and previous response to stimulation can all influence expectations.

People with polycystic ovary syndrome or high ovarian reserve may be more prone to a brisk response and ovarian hyperstimulation syndrome. Conversely, people with diminished ovarian reserve may have a lower follicle yield, even when doses are increased. More medication does not always produce a proportional improvement, and excessively high dosing can increase cost and burden without guaranteeing better outcomes.

This variability is one reason fertility care is so individualized. Two patients with the same diagnosis may have different medication plans, monitoring schedules, and cycle-cancellation thresholds. If your response differs from what you expected, it does not mean you did anything wrong; it often reflects ovarian biology and the cautious trial-and-adjust nature of treatment.

Ovarian hyperstimulation syndrome: the risk most people hear about

Ovarian hyperstimulation syndrome, or OHSS, is a potentially serious complication of ovarian stimulation. It occurs when the ovaries become enlarged and vascular permeability increases, allowing fluid to shift into the abdomen and other spaces. Mild bloating and pelvic heaviness can occur during stimulation, but OHSS is different in severity and trajectory.

Symptoms may include increasing abdominal distension, pelvic or abdominal pain, nausea, vomiting, diarrhea, rapid weight gain, decreased urination, shortness of breath, dizziness, or leg swelling. Severe OHSS can involve dehydration, electrolyte abnormalities, blood clots, kidney problems, fluid around the lungs, or hospitalization. Pregnancy can worsen or prolong OHSS because hCG levels rise after implantation.

Risk-reduction strategies may include careful dose selection, frequent monitoring, withholding or modifying a trigger, using an alternative trigger in appropriate IVF protocols, freezing embryos rather than transferring immediately, or canceling a non-IVF cycle when too many follicles develop. These decisions can be disappointing, but they are often made to protect safety.

Multiple pregnancy and other reproductive risks

When gonadotropins are used outside IVF, more than one follicle may ovulate. This increases the risk of twins, triplets, or higher-order multiples. Multiple gestation is often emotionally framed as a shortcut to completing a family, but medically it is higher risk for both the pregnant person and the babies. Risks include miscarriage, preterm birth, fetal growth restriction, hypertensive disorders, gestational diabetes, cesarean birth, neonatal intensive care admission, and long-term complications related to prematurity.

In IVF, the risk of multiple pregnancy is strongly influenced by the number of embryos transferred, embryo quality, patient age, and clinic policy. Ovarian stimulation itself creates multiple oocytes, but embryo transfer decisions determine much of the multiple-gestation risk in IVF cycles.

Ectopic pregnancy is another risk discussed in fertility treatment. An ectopic pregnancy occurs when a pregnancy implants outside the uterine cavity, most commonly in a fallopian tube. Fertility treatment does not remove this

possibility, especially in people with tubal disease or prior ectopic pregnancy. Early pregnancy monitoring is important so that the location and progression of a pregnancy can be assessed.

Adnexal torsion, cysts, and pelvic discomfort

As the ovaries enlarge during stimulation, they may feel heavy or tender. Some pelvic pressure can be expected, particularly near the end of an IVF stimulation cycle. However, sudden severe one-sided pelvic pain, pain with vomiting, faintness, or worsening pain should be assessed urgently.

Adnexal torsion occurs when the ovary, and sometimes the fallopian tube, twists around its supporting tissues. This can compromise blood flow and is a surgical emergency. The risk is higher when ovaries are enlarged, such as during stimulation or OHSS. Patients are often advised to avoid high-impact exercise, twisting movements, and vigorous intercourse during periods of ovarian enlargement, but specific activity guidance should come from the treating clinic.

Functional ovarian cysts may also be seen before or during treatment. Some cysts produce hormones and may lead a clinician to delay a cycle; others are observed. Management depends on ultrasound appearance, hormone levels, symptoms, and the planned protocol.

Medication side effects and injection-site issues

Common side effects of injectable fertility medications may include bloating, breast tenderness, mood changes, headache, fatigue, pelvic discomfort, and local injection-site redness, bruising, itching, or swelling. These symptoms are usually manageable, but they should still be reported if they are severe, persistent, or rapidly worsening.

Injection technique can affect comfort. Clinics often provide teaching on needle type, subcutaneous versus intramuscular administration when applicable, site rotation, medication mixing, and sharps disposal. If injections feel overwhelming, ask whether a nurse teaching visit, video demonstration, written checklist, or partner training session is available.

Allergic reactions are uncommon but require prompt attention. Symptoms such as generalized hives, facial or throat swelling, wheezing, or difficulty breathing should be treated as urgent. Patients should also tell their clinician about current medications, hormone-sensitive conditions, clotting history, and any prior reaction to fertility drugs.

Cancer concerns and long-term safety

Many patients worry that stimulating the ovaries could increase the risk of ovarian, breast, or uterine cancer. This is an understandable concern, especially because infertility itself, delayed childbearing, endometriosis, nulliparity, and genetic factors may also affect cancer risk. According to patient guidance from the American Society for Reproductive Medicine, current studies have not shown an increased cancer risk from fertility medications.

That said, long-term risk counseling should be individualized. A person with a strong family history of breast or ovarian cancer, a known hereditary cancer syndrome, prior cancer treatment, or complex gynecologic history may need additional counseling before fertility treatment. Fertility preservation and ovarian stimulation can still be possible in many situations, but they should be coordinated with the appropriate specialists.

Questions to ask before starting gonadotropins

Because gonadotropin treatment involves both medical and emotional intensity, preparation can make the experience feel more manageable. Consider asking your clinician:

What is the goal for this cycle: one follicle, a small number of follicles, or multiple follicles for IVF?

How will my starting dose be chosen, and what factors might lead to dose changes?

How many monitoring visits are typical, and what time of day are they offered?

At what point would you recommend canceling the cycle for safety?

What symptoms should prompt an urgent call, and who do I contact after hours?

What is my estimated risk of multiple pregnancy with this plan?

How will costs change if I need extra monitoring, additional medication, or a different trigger?

It may help to bring a partner, friend, or written notes to appointments. Fertility treatment can involve rapid decisions, and having a clear plan before stimulation begins can reduce anxiety if the cycle evolves unexpectedly.