



New Hope Fertility Center

MINI-IVF

STEP BY STEP

FROM EGG TO EMBRYO YOUR GUIDE TO IVF
A PATIENT HANDBOOK



Introduction

Getting Started

Dear Patient,

New Hope Fertility Center is a global leader in gentle, assisted reproductive methods that reduce stress on mothers and increase the chances of a healthy birth.

We emphasize personalized care and offer a full range of assisted reproduction services. Our practice combines cutting-edge technology with a commitment to low-drug methods of assisted conception. This approach offers a high level of success without the trauma and stress of heavy-dose hormone therapy integral to Conventional IVF treatment.

When you enter our facility, you will be greeted by a world-class team that uses the most advanced, yet gentle, treatments available. As you begin your treatment, we encourage you to keep a journal of your thoughts and note questions to ask during your appointments. Our team is here to provide support and ensure your experience is simple, successful, and stress-free.

We have designed this IVF Handbook to serve as a step-by-step treatment guide and a resource for information. We invite you to review the materials and contact our fertility team with any questions. This journey will be one of the most important and rewarding experiences of your life and we are here to support you every step of the way.

Warmly,



Dr. John Zhang,
MD, MSc, PhD, HCLD
Founder & Director
New Hope Fertility Center

About us

Patients Come first at New Hope Fertility Center.

We understand that the journey to parenthood can be challenging. That's why our staff is dedicated to supporting you through every stage of the journey. We are truly honored that you are considering New Hope Fertility Center and consider it our duty to provide you with the absolute best fertility care possible.

At New Hope Fertility Center, we custom-design our fertility treatments to each individual. Each person's unique fertility plan is designed to ensure that they are receiving the comprehensive care that is right for their body. Each person's unique protocol is specially designed to ensure the patient is receiving the highest quality care at the most optimal times for their body. We achieve this through blood testing and constant monitoring.

Our treatments at New Hope offer minimal stimulation and result in a gentler and more physiologically supportive experience. With a Conventional IVF cycle, numerous shots and medications simultaneously shut down the body's naturally occurring fertility system and create an artificial one, forcing the ovaries to create many eggs. Our Mini-IVF™ and Natural Cycle IVF protocols allow us to learn about your body so that we can help you augment and enhance your own, naturally occurring

fertility. New Hope diligently monitors and adjusts treatment protocols to nurture your body's highest quality eggs, allowing for high IVF success rates with Single Embryo Transfer. Our advanced technique for cryopreservation (vitrification) has over 90% thaw-survival-rate, providing you the option to freeze additional embryos.

Patients from around the world and of all ages, ethnicities, and sexual orientation are seen 365 days a year. Schedule a consultation today to get started with your customized fertility plan.

Whether you are exploring IVF options or looking to preserve your fertility, New Hope can assist you with your family planning. We are ready to provide you with a full range of both male and female assisted reproduction services.

Chapter 3

Mini-IVF™ Step-by-Step

What to Expect

During the initial consultation, you will meet with your personal care team to discuss your medical history and family goals so that, together, you can design a treatment plan tailored to your needs.

Your comprehensive fertility evaluation begins with a blood test to determine your FSH, estradiol, LH and progesterone levels, as well as a sonogram to determine your antral follicle count (AFC), which help dictate medication and treatment. You will receive routine sonograms to confirm follicular quantity and sizes. Subsequent blood tests and sonograms will aid in timing of the ovulation and establish a baseline for your endometrial lining thickness. This baseline will help us understand the likelihood that an embryo will implant on the uterine wall. Sonogram and blood test results ultimately determine when you will begin your treatment cycle and which treatment you will benefit from the most.

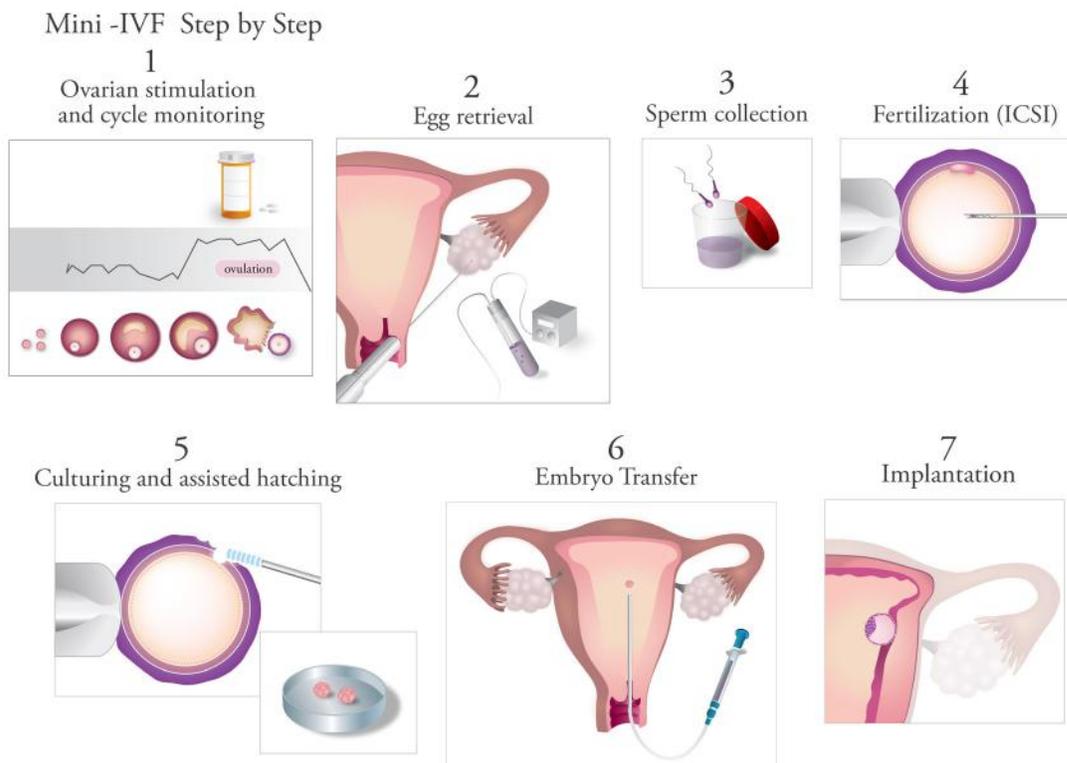


Figure 3.1 Mini-IVF™ Procedural Overview

Mini-IVF™ Procedural Overview

Mini-IVF™ stimulates your ovaries with minimal medications (4-6 oral stimulant, such as Clomid and/or an injectable combination of FSH and LH) to produce only the best quality eggs your body can mature in one cycle (approximately one to three eggs). The mild nasal spray, Synarel, is used for ovulation induction. Synarel has a short half-life in the body and does not have the side effect profile common to hCG. The major benefits of the Mini-IVF™ protocol are listed below.

- **Reduced health risks and discomfort**, often associated with daily drug injections and use of high-dose fertility drugs (see section 3.4).
- **Minimal medication requirement** and reduced cost of drugs.
- **Patients can cycle continuously**, eliminating the typical two to three month waiting period between cycles.
- Facilitates only the **best quality** follicles.

Step 1: Ovarian Stimulation and Cycle Monitoring

On or near day three of your menstrual cycle, you will begin a daily course of an oral stimulant, such as Clomid, as needed, until your follicles have developed sufficiently for ovulation. Some injectable medication may also be necessary depending on your hormonal requirements. Routine sonograms and blood tests will monitor follicular growth progression and ovulation.

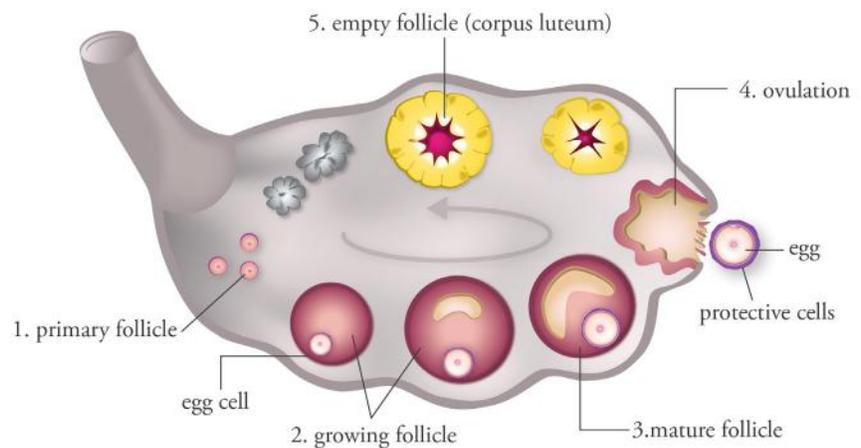


Figure 3.2a Follicular Growth Progression:
Once follicles have reached the desired size, ovulation will be triggered.

Step 2: Egg Retrieval

Prior to ovulation, once your follicles have reached the desired size and your hormone levels have risen, a trigger will be used to prompt final maturation. This typically happens about 36 hours before egg retrieval.

On the day of retrieval, a thin, flexible ultrasound-guided needle will be directed to the ovaries through the vaginal canal for egg collection. Since Mini-IVFTM uses a small flexible needle and retrieves only a few eggs, retrievals are relatively quick and simple. While you have the option of local anesthesia or IV sedation, most patients choose local anesthesia with an anti-anxiolytic such as Valium.

After retrieval you may experience spotting and abdominal tenderness. This is normal and should subside shortly after the procedure. Although the entire retrieval process will last approximately three to ten minutes, please allow a few hours for recovery. If any of your eggs are not fully matured at the time of retrieval, they may be matured via in-vitro maturation (IVM).

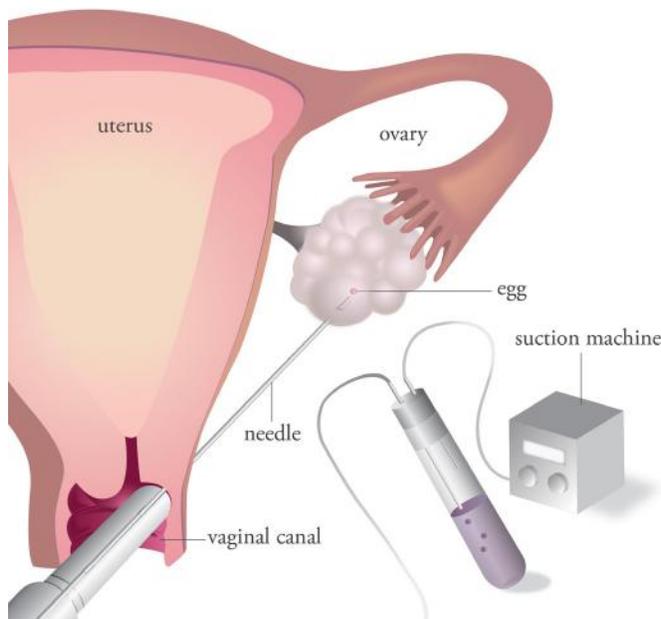


Figure 3.2b Egg Retrieval: An ultrasound-guided needle will be directed to the ovaries through the vaginal canal.

Step 3: Sperm Collection

Immediately following egg retrieval, sperm is collected from your male partner through ejaculation in preparation for fertilization. If your partner is unavailable the day of your retrieval, he may produce sperm at an earlier time and have it frozen until needed. Sperm previously obtained from a TESE may be used at this time as well. If you wish to use a sperm donor, your personal care team can guide you in the process of obtaining donor sperm prior to egg retrieval.

Step 4: Fertilization and Assisted Hatching

In most cases, the sperm is added to your mature egg(s) and fertilized via intracytoplasmic sperm injection. Once fertilized, cell division occurs in the zygote and may be transferred on the second day after fertilization. If the plan is to transfer an embryo into the uterus five days after fertilization, it must “hatch,” or escape from the zona pellucida, before it can implant for pregnancy. Thus, all zygotes in our laboratory undergo laser-assisted hatching on the third day after fertilization to enhance implantation as an embryo.

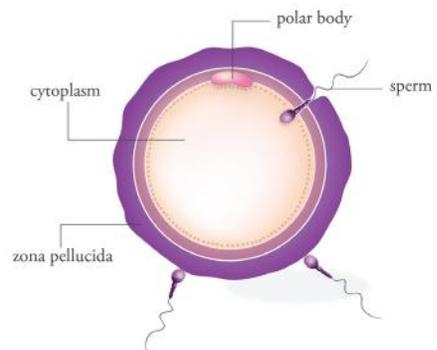


Figure 2.2 IUI: Washed sperm is injected into the uterine cavity.

Step 5: Culturing and Selection

Based on a patient's clinical history, embryos may be cultured up to the blastocyst stage prior to transfer. The culturing process aids in selecting the best quality embryos for transfer, ensuring the viability of the embryo for undergoing implantation, gestation and live birth.

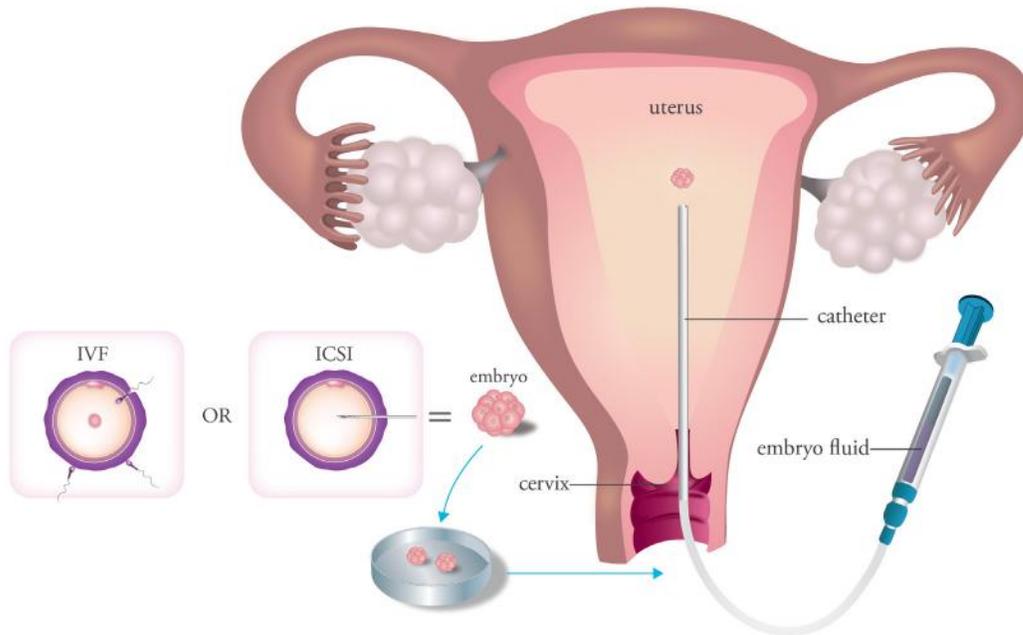


Figure 2.2 IUI: Washed sperm is injected into the uterine cavity.

Step 6: Embryo Transfer (Fresh or Frozen)

Embryo transfer only takes a few minutes and requires no incision or medication. In preparation, it is important that you maintain a regular schedule and avoid stress and strenuous exercise. The embryos are placed in a small amount of fluid and injected gently into the uterus through the cervix with a long, thin catheter. The transfer feels similar to a pap smear and requires no anesthesia, though you may experience minor cramping following the transfer. Post-transfer, embryo implantation generally takes two to five days. Since New Hope promotes a single embryo transfer policy, you can choose to freeze surplus embryos using our vitrification freezing method. These embryos may be banked for use in a subsequent cycle.

Step 7: Confirmation

Embryo transfer only takes a few minutes and requires no incision or medication. In preparation, it is important that you maintain a regular schedule and avoid stress and strenuous exercise. The embryos are placed in a small amount of fluid and inje

Considerations

While gentle protocols like Mini-IVF™ offer significantly lower risks and fewer side effects when compared to conventional IVF, any prescribed medications may have side effects and can pose a risk to your health. To best manage these risks, it helps to be informed. Please carefully review the potential risks and medication side effects below and discuss any questions or concerns with your personal care team.

Potential Risks of Treatment

Ovarian Hyper Stimulation Syndrome (OHSS)

Ovarian Hyper Stimulation Syndrome (OHSS) Ovarian Hyper Stimulation Syndrome (OHSS) is the most common risk associated with conventional IVF. During ovarian stimulation, the maturation of a large number of follicles within the ovary can cause the ovary to swell. As the follicles grow, the eggs inside are surrounded by fluid. When many eggs are retrieved, fluid can accumulate in the abdomen or the chest, requiring hospitalization. Vomiting, diarrhea and shortness of breath are some of the symptoms of severe OHSS, but discomfort and ovarian tenderness are also indicators. If you experience any of these symptoms, contact your doctor immediately. OHSS is very uncommon in minimal stimulation cycles, however it is still a slight risk. Multiple Births Multiple embryo transfers can result in a high-order pregnancy and have significant health risks to both the mother and the child. Additionally, the chances of premature delivery increase with high-order multiples. We advocate single embryo transfer to eliminate the risk of multiple births.

Potential Side Effects of Medication

If you experience any of the symptoms or side effects listed below, please contact your doctor immediately.

Birth Control Pills

Use:

Birth control pills are used to regulate FSH and LH.

How it works:

Birth control pills suppress the production of FSH and LH, which prevent the formation of a follicle and the subsequent release of an egg.

Side effects:

Headaches, nausea, bloating, spotting and breast tenderness.

Clomid (clomiphene citrate)

Use:

Clomid is used to stimulate the production of follicle stimulating hormone (FSH) and luteinizing hormone (LH), needed for ovulation induction and with continued use, premature ovulation suppression.

How it works:

Clomid causes the body to think estrogen levels are low, which results in the release of FSH and LH. These hormones ultimately stimulate production of follicles and the release of mature eggs. With extended use, Clomid acts to block the production of LH, which helps prevent premature ovulation.

Side effects:

Abdominal or pelvic discomfort, bloating, nausea, vomiting, breast tenderness, hot flashes, blurred vision, headache and irregular spotting.

Estrace (estradiol)**Use:**

Estrace is a form of estrogen that encourages uterine lining growth.

How it works:

Estrace mimics the effects of estrogen. It increases secretions from the cervix and promotes endometrial lining growth.

Side effects:

Nausea, vomiting, appetite loss, swollen breasts, acne or skin color changes, decreased sex drive or difficulty achieving orgasm, migraines, dizziness, chest pain, swelling of the ankles or feet, depression, changes in menstrual periods and irregular spotting.

Femara (letrozole)**Use:**

Femara is used to stimulate follicles and induce ovulation.

How it works:

Femara inhibits the production of estrogen, inducing the release of FSH and LH.

Side effects:

Hot flashes, headaches, loss of appetite, weight gain, general body discomfort, weakness, fatigue, nausea and diarrhea.

Antagon/Cetrotide (ganirelix acetate/cetrorelix)**Use:**

Ganirelix and Centrotide are forms of a protein used to reduce the amounts of certain hormones to suppress premature ovulation.

How it works:

Ganirelix and Cetrotide are injectable gonadotropin-releasing hormone (GnRH) antagonists that suppress the production and activity of LH and FSH. The amount of estrogen present is reduced.

Side effects:

Headaches, nausea, pain, redness, irritation and itching at injection site, abdominal swelling, pain or cramping.

Novarel, Pregnyl, Ovidrel (hCG)**Use:**

An hCG injection is used to induce ovulation.

How it works:

hCG mimics the action of the LH surge and triggers ovulation approximately 36-48 hours after its initial use. Egg retrievals can be timed as close to ovulation as possible to increase the chance of retrieving a mature egg.

Side effects:

Headaches, mood swings, mild swelling, breast tenderness, and pain or irritation at the injection site.

Ibuprofen**Use:**

This drug reduces inflammation to make follicles less likely to rupture.

How it works:

As a nonsteroidal anti-inflammatory drug, ibuprofen reduces hormones that cause inflammation and pain in the body. As the follicle is less inflamed, it is less likely to rupture prematurely.

Side effects:

Upset stomach, heartburn, diarrhea, constipation, bloating, gas, dizziness, drowsiness, rash and headaches

Synarel (nafarelin acetate)

Use:

Synarel is a nasal spray used to induce ovulation and cause final follicular maturation.

How it works:

Synarel causes an LH surge, which triggers ovulation approximately 36-48 hours after its initial use. Egg retrievals can be timed as close to ovulation as possible to increase the chance of retrieving a mature egg.

Side effects:

Headaches, hot flashes, mood swings, muscle pain, nasal irritation and runny nose.

Menopur and Repronex (menotropins)

Use:

Menopur and Repronex are an equal mixture of the naturally occurring follicle-stimulating hormone (FSH) and luteinizing hormone (LH) in the form of a subcutaneous injectable. They are commonly used in women with a low FSH baseline.

How it works:

Menopur and Repronex are a combination of FSH and LH hormones that stimulate ovaries to produce follicles.

Side effects:

Abdominal pain, back pain, breast enlargement, chills, nausea, dizziness, fever, flu-like symptoms, flushing, general body discomfort, headaches, menstrual changes, muscle or joint pain and pain or rash at the injection site.

Frequently Asked Questions

Below is a list of frequently asked questions. If the following answers do not fully address your questions or concerns, please do not hesitate to contact a member of your personal care team..

Why do some fertility treatments begin with birth control pills?

Birth control pills do not affect a woman’s ability to become pregnant once she has discontinued their use. Rather, the medication regulates a woman’s cycle to synchronize follicle development prior to ovarian stimulation.

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Is there an age limit for Mini-IVFTM?

We do not have an age limit for pre-menopausal women.

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If I decide to use a surrogate, are there special considerations?

There are complex legal issues associated with surrogacy that should be first discussed with an attorney who specializes in surrogacy prior to making decisions on treatment.

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What percentage of patients choose Mini-IVFTM?

95% of our patients choose this protocol.

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Who is a candidate for Mini-IVFTM?

Mini-IVFTM is suitable for all pre-menopausal women even if they have responded poorly to previous conventional IVF attempts.

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Can stress or changes to my normal routine affect the treatment process?

Yes. It is necessary to reduce stress and changes to your daily routine during the entire treatment process.

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Why does Mini-IVFTM require fewer hormones?

Exposure to high doses of hormones can mature a large quantity of eggs at the expense of egg quality. Lower hormone doses help the body produce only the best quality eggs a woman can mature in one cycle to produce a healthy baby.

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How long will I take medications before an egg retrieval?

Most women take medication for 9-13 days.

Will all my retrieved eggs be transferred?

The number of eggs retrieved is not necessarily the number of embryos viable for transfer.

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Does New Hope perform multiple embryo transfers?

While we can perform multiple embryo transfers on request, at New Hope, we promote single-embryo transfers to reduce the risks associated with multiple births. Surplus embryos can be frozen using our vitrification method and stored in your personal embryo bank for later use.

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Clomid has been used for decades. Are newer and more efficacious drugs available in place of Clomid?

Clomid remains the most prescribed fertility drug worldwide and is considered the first line in infertility treatment medication.

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Have Clomid success rates improved since it was first introduced?

Clomid success rates have improved markedly due to technological advances in the field of assisted reproduction.

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How often can I take a course of Clomid?

We generally allow patients to use Clomid for five to ten cycles due to the low dosage.

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Is Clomid strong enough even for women over 35?

Women over 35 do very well with natural and low stimulation cycles using Clomid. These women generally produce higher FSH in response to Clomid because they have a smaller ovarian reserve than younger women and therefore do not usually require the FSH injections used in conventional therapy.

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Why does New Hope use Synarel instead of hCG with Mini-IVFTM Cycles?

HCG has a long half-life and can stimulate immature follicles for long periods of time and lead to cyst formation. Synarel, alternatively, is strong enough to induce ovulation of larger follicles, but has a very short half-life. This preserves smaller follicles for future cycles, rather than stimulating them prematurely. As a result, the chances of healthy egg production are increased and women can cycle continuously. Synarel is especially advantageous for older patients with a limited ovarian reserve.

How do you know I will not ovulate prior to retrieval?

During your menstrual cycle, an estrogen sensor activates the hypothalamus to trigger an LH surge, which induces final maturation when the lead follicle reaches its optimal size. Clomid causes the body to think estrogen levels are low, which results in the release of FSH and LH. These hormones ultimately stimulate follicular production and the release of mature eggs. Over time, Clomid also acts to block the production of LH, which helps reduce the chances of premature ovulation.

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Why is injectable FSH recommended for some women with Mini-IVFTM ?

Often, patients with a very low baseline FSH cannot produce enough FSH with Clomid and require additional FSH to aid follicular development.

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Do fertility drugs cause cysts?

Sometimes an immature follicle can evolve into a cyst during the following cycle. In particular, hCG injections can facilitate cyst formation. The presence of a cyst does not necessarily mean you cannot begin another cycle, however we minimize the risk of cyst formation by using Synarel as a trigger instead of hCG.

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What happens if I do not become pregnant?

If your treatment is not successful, your personal care team will meet with you to discuss your options.

What to Expect

Your Personal Care Team at New Hope will work with you and your oncology team to coordinate care and to design a tailored treatment plan. Many of the fertility treatments outlined in this handbook are available to patients who are diagnosed with cancer or are looking to preserve their fertility prior to undergoing cancer treatment.

New Hope offers gentle stimulation techniques to aid in fertility preservation through oocyte or embryo cryopreservation. From the start of stimulation to banking, the process usually lasts three to four weeks and facilitates a speedy return to all other necessary treatments. A combination of Femara or Tamoxifen with gonadotropin injections has proven to be safe and effective.

We require the approval of your treating oncologist and ask that you provide all medical records pertaining to your cancer treatment including surgical and biopsy reports, as well as pathology reports and any tumor marker tests.

Femara (letrozole)	Tamoxifen (nolvadex)
<p>Use: An aromatase inhibitor used in the treatment of breast cancer. One of the effects of inhibiting aromatase is the stimulation of hormones which then induce oocyte development.</p>	<p>Use: Tamoxifen is used in the treatment of breast cancer to delay recurrence. By blocking hormones which may stimulate cancer recurrence, hormones that stimulate the ovaries are produced.</p>
<p>How it works: Femara blocks the production of estrogen. Therefore, the body receives fewer growth signals and cancer growth can be slowed or stopped. Decreased estrogen levels also cause the release of FSH and LH, which stimulate follicular development and ovulation.</p>	<p>How it works: Tamoxifen blocks the actions of estrogen causing the release of FSH and LH. FSH and LH stimulate follicular development and ovulation.</p>
<p>Side effects: Hot flashes, headache, weight gain, general body discomfort, weakness, fatigue, nausea and constipation.</p>	<p>Side effects: Bone pain, decreased sex drive or difficulty achieving orgasm, headache, and hot flashes.</p>

Out of Town Patients

If you are an out of town patient, take time to consider the important factors below before starting treatment.

Pre-Screening Tests

The provided IVF Checklist for Pre-Screening Testing lists all infectious disease and genetic screening tests that must be completed prior to starting an IVF cycle. If any of the required medical testing is performed outside of our facility, please fax us all medical records and test results. All infectious disease tests must be completed within one year from the date you start your IVF cycle at New Hope. If pre-screening tests were completed more than one year ago, they are invalid and will need to be re-administered before your IVF cycle can begin. Genetic screening tests are accepted regardless of the date performed. IVF screening test results will determine the candidacy of you and your partner.

Consent Forms

All consent forms must be read prior to your visit to New Hope.

On the day of your appointment at New Hope, a nurse will assist you in completing all consent forms and will witness you and your partner's signature(s).

Financial Considerations

You must contact our Financial Department prior to the start of your IVF cycle. Financial Coordinators are available 7 days a week.

Monitoring

If you are on the first day of your period or are to schedule a monitoring visit, please call and inform our clinical staff that you are an out of town monitoring patient and need orders for your local clinic. Physician orders for the first monitoring visit will then be sent to your local clinic. This ensures all correct testing is performed and that results will be sent directly to our clinic. It is also necessary to find a local clinic or hospital that can perform "same day" results on hormone levels so you can receive detailed instructions immediately following the review of results for each monitoring visit. Finally, when choosing a local clinic, please be mindful of coordinating office hours and be sure to check whether weekend monitoring is possible. Please be sure to call our office by 3pm EST each monitoring day if you have not received a call from your Personal Care Team with instructions. This may mean that we have not received the day's results and will need to follow up with your clinic. Also, please inform our clinical staff of your preferred pharmacy, their contact information and business hours.

Retrieval

A semen specimen must be available on the day of your egg retrieval, if your plan is to fertilize the oocytes retrieved (fresh transfer). If the sperm is fresh, your spouse/partner will be asked to produce a semen specimen. If the sperm is frozen, when from a spouse/partner or donor, it must be at New Hope prior to the egg retrieval. If you have any questions regarding semen analysis, semen collection, sperm freezing/storage or transporting frozen sperm vials, please call and speak with someone in our Andrology Laboratory prior to starting your IVF cycle. As you approach the date of your egg retrieval, we recommend that you and your spouse/partner begin preparations for the trip to our office in New York. Your Personal Care team will help you coordinate scheduling to ensure you arrive to New York on time.

Financial Considerations

A Financial Coordinator is available as part of your Personal Care Team to discuss all concerns about financing your treatment. Each person receives an individualized treatment plan and you will receive your plan and pricing information during the initial consultation.

If applicable, prior to your initial consultation, we will contact your insurance provider to get a comprehensive understanding of your fertility coverage and when necessary, obtain all required pre-authorizations and file all in-network claims paperwork on your behalf.

During the initial consultation your Financial Coordinator will also schedule payment for all fees not covered by your insurance, including co-pays, out of network charges and deductibles. All fees must be paid in full prior to starting your treatment course. We accept cash, money orders and most major credit cards

Glossary

The following terms either appear in this handbook or will be used commonly by your Personal Care Team

Androgen: A male sex hormone that is produced in the testes and is responsible for typical male sexual characteristics.

Anovulatory cycle: A cycle during which the ovaries fail to release an oocyte. Therefore, ovulation does not take place. Chronic anovulation is a common cause of infertility.

Anesthesia: Loss of bodily sensation with or without loss of consciousness.

Antral follicle count: The number of follicles detected by the ultrasound at the beginning of the menstrual cycle. This indicates the size of your ovarian reserve.

Assisted hatching: A procedure performed after fertilization and prior to implantation in which the zona pellucida of the embryo is partially opened by application of a laser to facilitate embryo implantation.

Assisted reproductive technology (ART): All fertility treatments that include the handling of eggs and sperm.

Basal Body Temperature (BBT): Body temperature in the morning before rising, moving about or eating.

Blastocyst: An embryo usually five days after fertilization that has formed a fluid-filled cavity. At this stage the cells begin to form the early placenta.

Cervix: The narrow entrance to the uterus.

Clinical pregnancy: A pregnancy confirmed by hormone levels and visible by ultrasound.

Clomiphene challenge test (CCCT): A common test of ovarian reserve in which FSH is checked on days three and ten of the menstrual cycle and Clomid is taken on days five through nine.

Cryopreservation: Freezing at a very low temperature to keep embryos, eggs, or sperm viable for further transfer or fertilization. Vitrification is an advanced type of cryopreservation.

Corpus albicans: The regressed form of the corpus luteum.

Corpus luteum: A yellow mass of cells that forms from an ovarian follicle during the luteal phase of the menstrual cycle.

Cyst: An abnormal, closed, sac-like structure within a tissue that contains either fluid or tissue. A cyst can occur anywhere in the body and can vary in size.

DNA: The hereditary material in humans and almost all other organisms.

Dominant follicle: The follicle that outgrows all other follicles in the ovary. In a natural cycle only one follicle becomes dominant and this results in only one egg being released.

Ectopic pregnancy: A pregnancy where the embryo is not embedded in the uterine lining. Usually it is lodged in the fallopian tubes.

Egg: The female sex cell produced and matured by the ovary, also called an ovum or oocyte.

Egg retrieval: A procedure performed right before ovulation in which eggs are removed from the ovaries via an ultrasound-guided needle and suction.

Ejaculation: The discharge of semen.

Ejaculatory duct: A canal formed by the union of the vas deferens and the duct from the seminal vesicles.

Embryo: A fertilized egg that has begun cell division.

Embryo bank: A collection of stored embryos.

Embryo transfer: Placement of an embryo into the uterus.

Endometriosis: A condition in which tissue resembling the lining of the uterus grows outside the uterus. It is often associated with infertility.

Endometrium: Layer of fine tissue completely covering the inside of the uterus. It is very sensitive to hormones and there is a window of time when the embryo can attach and start growing into it.

Epididymis: A tubule in each testicle that carries sperm to the vas deferens.

Estradiol: The most common estrogen (hormone) produced by the ovaries.

Estrogen: The female hormone largely responsible for the development of female secondary sex characteristics, the thickening of the endometrium and regulating the other aspects of the menstrual cycle.

Fallopian tubes: Part of the female reproductive system where sperm and egg meet in normal conception. This pair of tubes leads from each ovary to each side of the uterus.

Female factor infertility: Infertility caused by the female reproductive system.

Fertilization: The union of sperm and egg to form one cell with the genetic material of both parents.

Fibroids: Non-cancerous growths of the uterine wall that can cause abnormal uterine bleeding and pain.

Fimbria: Thin finger-like projections lining the fallopian tubes. **Fluorescent In Situ hybridization:** A technique that uses fluorescent markers to detect changes in the genetic material.

Fluoroscopy: An imaging technique that uses X-rays to cast shadows of an internal structure on a fluorescent screen; the shadows vary in intensity according to the density of the structure.

Follicle: A fluid-filled sac in the ovary containing an egg.

Follicle-stimulating hormone (FSH): The pituitary hormone responsible for stimulating the growth and maturation of follicles. It acts in concert with LH.

Frozen egg bank: A collection of stored eggs.

Frozen embryo transfer (FET): The transfer of a once cryopreserved embryo, now thawed, via IVF into the uterus.

Genome: The total genetic information of a particular organism.

Gestation: The period during which an embryo develops.

Gestational surrogate: A woman who carries a pregnancy for another woman. The surrogate does not have a genetic relationship to the resulting child. The pregnancy is derived from the egg and sperm of the intended parent and her partner or donor, not the surrogate.

Gonadotropin releasing hormone (GnRH): Hormone secreted by the hypothalamus, a control center in the brain, that prompts the pituitary gland to release FSH and LH.

GnRH agonists: A GnRH analog that initially stimulates the pituitary gland to release LH and FSH. It can be used at the beginning of an IVF cycle to help stimulate follicular growth.

GnRH analogs: Synthetic hormones similar to the naturally occurring gonadotropin releasing hormone used to prevent premature ovulation. There are two types of GnRH analogs: GnRH agonists and GnRH antagonists.

GnRH antagonists: Synthetic hormones similar to the naturally occurring gonadotropin releasing hormone, that are used to prevent premature ovulation. These medications have an immediate suppressive effect on the pituitary gland.

Human chorionic gonadotropin (hCG): A hormone produced by the placenta, the detection of which is the basis for most pregnancy tests. It induces ovulation and follicular maturation.

Hormone replacement therapy (HRT): The administration of estrogen, progesterone, or a combination of the two to counteract the hormonal effects and the decrease in these hormones during menopause.

Hyperthyroidism: Over production of thyroid hormones due to an overactive thyroid.

Hypothyroidism: Under production of thyroid hormones due to an underactive thyroid.

Hypothalamic pituitary disorder: The loss of function in an endocrine gland due to a failure of the pituitary gland to secrete hormones that stimulate the endocrine gland's function.

Hypothalamus: A specific area of the brain that regulates many basic functions in the body including temperature, blood pressure, and satiety.

Hysterectomy: This refers to the surgical removal of a woman's uterus.

Implantation: The process in which the embryo attaches to the endometrium and starts growing into it, inducing blood vessel growth. Incubator: An apparatus consisting of a box designed to maintain a constant temperature by the use of a thermostat.

Incubator: An apparatus consisting of a box designed to maintain a constant temperature by the use of a thermostat

Intracytoplasmic sperm injection (ICSI): A procedure in which a single sperm is injected directly into an egg.

Insemination: The placement of sperm into the uterus.

In-vitro fertilization (IVF): A process in which an egg and sperm are united in a laboratory dish to facilitate fertilization.

In-vitro maturation: The technique of allowing ovarian follicles to mature in vitro.

Intrauterine insemination: Also known as artificial insemination, this procedure involves placing washed sperm directly into the uterus.

IV sedation: Sedation or anesthetic medications delivered through an intravenous (IV) line.

Laser-assisted hatching: A method for softening the zona pellucida of the egg to facilitate implantation.

Laparoscopy: A diagnostic procedure in which a long narrow fiber-optic instrument, called a laparoscope, is inserted through an incision in or below the woman's navel so that the internal organs may be observed.

Luteinizing hormone (LH): The pituitary hormone that controls the length and sequence of the menstrual cycle, including ovulation and follicular maturation.

Male factor infertility: Infertility caused by a problem in the male reproductive system.

Menopause: The period when the menstrual cycle ceases.

Menstruation: Monthly discharge of the endometrial lining from the uterus in non-pregnant women from puberty to menopause.

Motility: Sperm cells' ability to move spontaneously and independently.

Oocyte: See "egg."

Ovarian Hyperstimulation Syndrome (OHSS): A condition that can result from ovulation induction. OHSS is a particular concern in conventional IVF. It is characterized by enlargement of the ovaries, ovarian tenderness, fluid retention and weight gain.

Ovarian reserve: A woman's fertility potential, measured by the number of eggs she has remaining.

Ovary (Ovaries): The two female sex glands in the pelvis, located on each side of the uterus near the end of the fallopian tubes. The ovaries produce eggs and various hormones.

Ovulation: Release of an egg from the ovary.

Penis: The external part of the male reproductive system.

Pituitary gland: A small gland just beneath the hypothalamus in the brain that secretes many hormones regulating body processes, including FSH and LH.

Placenta: The membranous vascular organ that develops during pregnancy, lining the uterine wall and partially enveloping the fetus. It is attached by the umbilical cord. Following birth, the placenta is expelled.

Preimplantation genetic diagnosis (PGD): A genetic screening test in which a few cells are removed from an embryo on day three or from a blastocyst on day five.

Pregnancy: The period from conception to birth when a woman carries a developing fetus in her uterus.

Progesterone: A female hormone secreted during the luteal phase of the menstrual cycle that prepares the lining of the uterus for embryo implantation.

Prolactin: A hormone produced by the pituitary gland that controls milk production (lactation).

Prostate: A chestnut sized gland in males at the neck of the urethra which produces the fluid part of semen.

Rh: Rhesus factor is a blood group antigen found on red blood cells of Rh positive individuals.

Scrotum: A pouch of skin that contains the testes, epididymis and lower portions of the spermatic cords.

Semen: The fluid containing sperm, also known as seminal fluid.

Seminal vesicles: A pair of pouch-like glands located on either side of the urinary bladder that secrete seminal fluid.

Sonogram: A diagnostic medical image of internal organs or an unborn fetus created using an ultrasound.

Sperm: The male reproductive cells that can fertilize a woman's egg.

Sperm washing: A procedure to separate out sperm from seminal fluid.

Spermatogenesis: The formation and development of sperm.

Subcutaneous: Beneath the skin.

Sexually transmitted disease (STD): An illness that is passed on by means of sexual contact.

Testes: Male reproductive glands that produce sperm and secrete androgens.

Testicular sperm extraction (TESE): Operative removal of testicular tissue in an attempt to collect living sperm for use in an IVF-ICSI procedure.

Testosterone: A steroid hormone primarily secreted in the testes and the ovaries that is responsible for male traits.

Timed intercourse: Planning intercourse to sync with the sustained shift in body temperature that occurs during a woman's menstrual cycle.

Traditional Surrogate: Used in cases of female factor infertility. A traditional surrogate is a fertile woman who carries a pregnancy intended for another family, conceived from her egg and the sperm of the infertile woman's partner. The resulting child carries the surrogate's genes.

Transvaginal ultrasound aspiration: An ultrasound-guided technique for egg retrieval whereby a long, thin needle is passed through the vaginal and ovarian walls and into the ovarian follicle. Egg retrieval occurs when suction is applied.

Trophectoderm: Outer cell layer of a blastocyst.

Turner's syndrome: A chromosomal disorder in females who have only one X chromosome. The disease is characterized with dwarfism, heart abnormalities, and underdeveloped sex organs.

Ultrasound: A technology that uses high-frequency sound waves to create an image of internal organs on a monitor. Fertility specialists use it to monitor the growth of ovarian follicles, to retrieve eggs from follicles, and to evaluate a pregnancy.

Urethra: A duct in males and females through which urine is discharged. The urethra in males also serves as the genital duct.

Uterus: The hollow, muscular, female reproductive organ located in the pelvis that houses the embryo during pregnancy. The lining of the uterus is shed each month during menstruation when pregnancy has not occurred.

Vagina: The canal in the female reproductive system that leads to the cervix.

Vaginal culture: A sample of the bacteria in the vagina.

Vas deferens: The two muscular tubes in the male reproductive system that carry sperm from the epididymis to the urethra.

Vitrification: An advanced form of cryopreservation that uses cryoprotectants and a flash-freezing method to preserve eggs, sperm and embryos. It has a thaw success rate of 98%, largely because the method does not allow damaging ice crystals to form in the preserved specimen.

Zona pellucida: The egg's outer layer that a sperm must penetrate in order to fertilize the egg. In assisted hatching the zona pellucida is punctured.

Zygote: A fertilized egg before cell division begins. It is a single cell that contains the genetic material of both parents.

Meet Our Doctors



“Every woman is unique and therefore customized treatments will give each couple the highest chance of success—a more tailored approach in combination with the latest IVF technology will give you the family you hope for.”

John J. Zhang, MD, MsC, PhD

Doctor Zhang is the Founder/CEO of New Hope Fertility Center in New York City where he has served as the Medical Director since opening in 2004, and oversaw the expanding fertility network internationally to China, Russia, and Mexico.

A true pioneer in the area of minimally invasive (Natural Cycle and Mini-IVF™) fertility care, Dr. John Zhang is an active researcher and medical technology developer. He has been behind several notable achievements in the area of assisted reproductive technology (ART), including the birth of a child by a 49 year-old using her own eggs, helping to restore a young woman’s fertility through a recent ovarian tissue transplant surgery in February of 2012, and being named one of New York’s Top Doctors.

Dr. Zhang completed his medical degree in at the Zhejiang University School of Medicine, and

subsequently received his Master’s Degree at Birmingham University in the UK. In 1991, Dr. Zhang earned his Ph.D. in In-Vitro Fertilization (IVF), and, after studying and researching the biology of mammalian reproduction and human embryology for nearly ten years, became the first Fellow in the Division of Reproductive Endocrinology and Infertility of New York University’s School of Medicine in 2001.

Today, Dr. Zhang continues his research in non-embryonic stem cell research, long-term cryopreservation of oocytes, and oocyte (human egg cell) reconstruction by nuclear transfer. He is currently one of a handful of Reproductive endocrinologists in the United States to hold a Ph.D. in embryology while also being certified as a High Complexity Lab Director.

Keep up with the latest from Dr. Zhang on his blog where he talks about trending topics in the field of Assisted Reproductive Technologies and IVF.

Dr. Zhang speaks English and Chinese.



ZAHER MERHI, MD, FACOG

Dr. Merhi is an internationally recognized fertility doctor, guest lecturer and grant reviewer. With a strong background in Reproductive Endocrinology and Infertility, his research focuses on “needle-free IVF”. The purpose of needle-free IVF is to use oral medications instead of the daily injections and also to measure hormones in the urine and saliva rather than in the blood. His research also focuses on obesity-related infertility, Polycystic Ovary Syndrome (PCOS), Minimal Stimulation IVF (Mini IVF), and Natural IVF for women with low ovarian reserve.

Dr. Merhi attained his Bachelor of Science degree in Biology and a medical degree from the American University of Beirut in Lebanon. He completed his residency in Obstetrics and Gynecology at Maimonides Medical Center in Brooklyn, New York after which he did a two-year Postdoctoral Fellowship in Reproductive Endocrinology at Albert Einstein College of Medicine in Bronx, New York. Subsequently, he completed a three-year Clinical Fellowship in Reproductive Endocrinology and Infertility at Albert Einstein College of Medicine/ Montefiore Medical Center in Bronx, New York.

Board-certified in Reproductive Endocrinology and Infertility by the American Board of Obstetrics and Gynecology, Dr. Merhi is an Assistant Professor in Reproductive Endocrinology and Infertility. As an active researcher and honoree of many awards, Dr. Merhi has published over 60 manuscripts in respected medical journals such as Journal of Clinical Endocrinology and Metabolism, Fertility and Sterility, and Human Reproduction, as well as many book chapters. He continues to present his research at national and international scientific conferences. Various media outlets have reported on his research including ABC News, Medscape, and dietsinreview.com.

Dr. Merhi serves as a Chair, Moderator, Reviewer, and Member on several committees such as American Society for Reproductive Medicine (ASRM), New England Fertility Society, Society for Reproductive Investigation, and Endocrine Society. He has also served as a grant reviewer for the National Institute of Health (NIH). He evaluates, edits, and reviews manuscripts for over 60 scientific journals. Dr. Merhi uses his extensive research background to provide the most up-to-date medical advances in infertility treatments. Dr. Merhi Speaks English, Arabic, French and Spanish.

“I look to form a personal relationship with patients to establish confidence and provide superior fertility and endocrinology care.”



ZITAO LIU, MD, PH.D., FACOG

Dr. Zitao Liu is world-renowned fertility doctor with a deep understanding of the field of Assisted Reproduction Technology (ART). His focus is on the development and implementation of individualized patient protocols in order to maximize a patient's chance of conception. He received his medical degree from the Norman Bethune University of Medical Sciences in China, then went on to earn his PhD from Wayne State University, studying pre-implantation embryonic development and completed his post-doctoral research on uterine responses to embryo implantation at Vanderbilt University. He completed his residency training in Obstetrics and Gynecology at Bronx-Lebanon Hospital Center, an affiliate of the Albert Einstein College of Medicine and, before joining New Hope Fertility Center in New York City, he practiced academic medicine as an attending physician in the Department of Obstetrics and Gynecology at Tufts Medical Center.

“I would like to integrate the results of the cutting-edge research into clinical practice and find the best protocol for each individual woman I work with.”

Dr. Liu has received many teaching awards from the Albert Einstein College of Medicine, the Tufts University School of Medicine, and the American College of Obstetricians and Gynecologists. Years of clinical practice and academic research have shown Dr. Liu the limitations of conventional IVF. He is not only a strong advocate of minimal stimulation IVF protocols (Natural IVF and Mini-IVF™) for indicated patients, but is an accomplished surgeon for minimally invasive procedures as well.

Dr. Liu still actively continues his clinical research in embryo implantation and trophoblast differentiation. At the same time, he is constantly pursuing the development of new medical devices, novel medications, and advanced diagnostic approaches.

Dr. Liu Speaks English and Chinese



MINGXUE YANG, MD, PH.D.

Dr. Yang is an internationally celebrated, NY infertility doctor, board certified in Obstetrics and Gynecology. He specializes in minimally invasive procedures with a strong interest in treating patients with PCOS, diminished ovarian reserve, Mini-IVF™, Natural IVF, and uterine lining issues. Since joining New Hope Fertility Center in 2008, he has actively participated in groundbreaking research projects as well as daily clinical procedures. He has been selected as a Top Obstetrician & Gynecologist in the United States since 2009.

Dr. Yang received his MD with high honors from Henan Medical College in 1983, and his Masters and Ph.D. in Toxicology from Tongji Medical University in China in 1986 and 1989. While working in Beijing, Dr. Yang was appointed Associate Director of the Molecular Biology Laboratory at the Institute of Occupational Medicine with the Chinese Academy of Preventive Medicine. He

was subsequently appointed as Assistant Professor in the Department of OB/GYN at New York University's School of Medicine in 1998. He has published more than 30 papers in internationally recognized journals.

Doctor Yang completed his internship and residency training in Obstetrics & Gynecology at NYU's School of Medicine and the New York Downtown Hospital. Upon graduating, he was appointed as teaching attending in the Department of OB/GYN at New York Downtown Hospital affiliated with New York-Presbyterian Healthcare System and Weill Cornell Medical College. He received the National Faculty Award for Excellence in Resident Education in 2006 by the Council on Resident Education in Obstetrics and Gynecology. In 2005, he also received an award for Special Excellence in Endoscopic Procedures by the American Association of Gynecologic Laparoscopists.

Dr. Yang speaks English and Chinese.

"In my last four years with New Hope, I've done more than 2000 procedures involving embryo transfers. With a background in internal medicine, I've instilled this experience into our treatments, which complement the mind, body, and health history of each patient."

Department directory

If you would like to contact one of our departments

directly please use the numbers below:

NEW PATIENTS

If you would like to schedule a consultation or learn about becoming a patient at New Hope Fertility Center, **call us at 917-525-5496 or contact us online.**

GENERAL INQUIRIES

If you are an existing patient or a referring physician with questions about our practice, **please contact us at 212.517.7676**

OFFICE ADDRESS

**4 Columbus Circle, 4th Floor
New York, NY 10019**

(corner of W. 58th St. and 8th Ave.
next to Duane Reade in the Steel
Case Building)

OFFICE HOURS

Monday-Friday: **7am - 5pm**
Saturday-Sunday: **7am - 3pm**

MONITORING HOURS

Monday-Friday: 7am - 2pm
(by appointment only)
Saturday-Sunday: 7am - 2pm
(by appointment only)

HOLIDAY HOURS

7:30am - 10:30am

DEPARTMENT

New Patients Schedule Online

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NON-CLINICAL

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