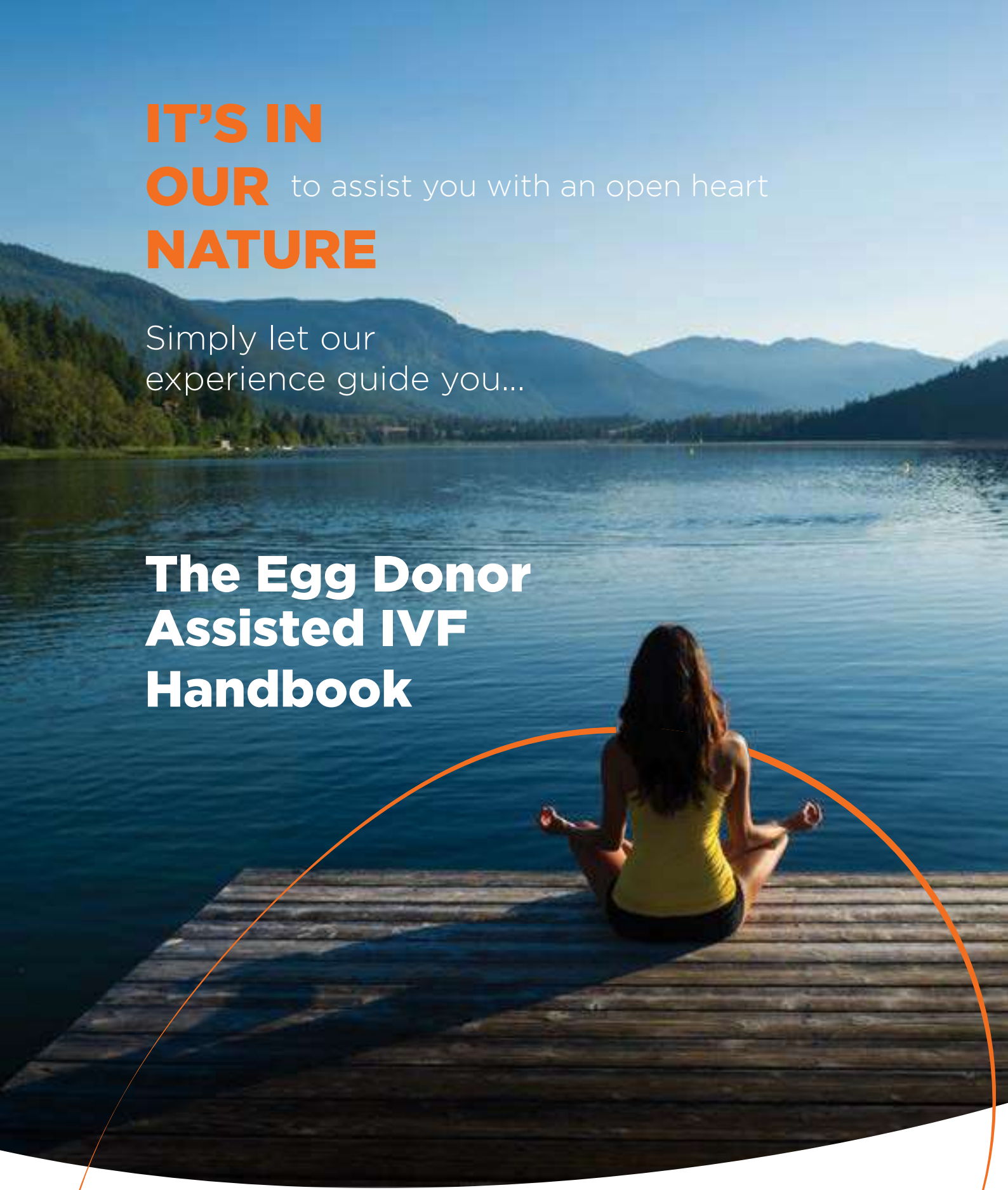

IT'S IN OUR NATURE to assist you with an open heart

Simply let our experience guide you...

The Egg Donor Assisted IVF Handbook

EDU

Second Edition 2024

Welcome

to the first edition of the comprehensive handbook to donor-assisted reproduction and gestational surrogacy!

EDU Fertility took the initiative and published a collection of the most sought after articles touching on conception, pre and post implantation, pregnan - cy, and birth resulting from donor-assisted IVF or gestational surrogacy. We even include topics most **EDU Fertility** couples and single moms-to-be haven't thought about.

We at **EDU Fertility** pride ourselves on always listening to our intended parent(s) when something bothers them, when they have a question, or they just want emotional support and encouragement. **EDU Fertility's** professional staff are always available for whatever you need. We are here for more than just to provide pregnancy-related services. When we say, "Join the EDU Fertility family," it has a lot more meaning.

Therefore, if you do not find the information you are searching for in this first edition of the handbook, please email us and we will provide you with the additional information and be sure we will add the information in the next edition.

If you have any questions and would like to schedule a free on-line consultation, https://www.eggdonationukraine.com/to BOOK NOW.

"*Be kind, have courage and always believe in a little magic*."

Cinderella

Ira Nissel – Founder

EDU Fertility Ukraine

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HOW WE SUPPORT YOU - YOUR PATH TO PARENTHOOD

Navigating the path to parenthood can be a joyous yet challenging journey, especially for those considering egg donation. At EDU, we understand the unique emotional and physical considerations that accompany this decision. Our mission is to provide personalised support and understanding, guiding you through every step of the process with empathy and expertise.

At EDU, dreams find their melody, and I am the maestro orchestrating the symphony of miracles. I'm not just a guide; I am a narrative woven with the vibrant threads of adoption, the triumphant crescendo of twinhood through three IVF cycles, and the profound privilege of facilitating over 800 harmonious journeys of successful IVF and egg donation cases since 2012.

THE HARMONY OF PERSONAL EXPERIENCE

My story is more than a biography; it's the score that resonates with your journey. Born in Miami, I embarked on a unique path, experiencing the gift of adoption months before my birth. This personal connection allows me to empathise and understand the intricate emotions that accompany the decision to explore donor-assisted IVF. As a father of twins born from artificial reproduction, I guide others, and my life's composition mirrors the challenges and triumphs of this intricate journey.

NAVIGATING THE MAZE OF UNCERTAINTY

The realm of donor-assisted IVF is a maze of choices, and as your guide, I aim to illuminate the path. The first verse often echoes the question, "Which clinic?" It's a crucial note in the symphony of success. With over a decade of experience, I've worked with the top 8 fertility clinics in Kyiv, and eventually, we gradually whittled down the eight clinics to one. A pioneering fertility clinic providing reproductive services for 29 years. Our donor assisted IVF started back in 1996.

The reason is the performance of the embryology lab and the staff of embryologists. Our Live Birth rate is 86% and is the highest among fertility clinics.

Given my own personal life experience and working with couples and single women who want to conceive, EDU acts as the bridge between the medical and emotional aspects of the donor-assisted IVF process.

OUR PROVEN APPROACH

EDU created a donor assisted IVF program for its clients after looking back at all 800+ programs that yielded the most live births and today we apply an emphasis on the following:

Fresh Oocytes for Optimal Success

We prioritise using 12 fresh oocytes over frozen oocytes, as research has consistently shown that fresh oocytes cycles yield improved embryo quality especially blastocysts compared with frozen oocytes.

Advanced Sperm Sorting for Enhanced Embryo Quality

EDU employs advanced sperm sorting techniques like PICSI and Microfluidic sperm sorting (MSS) to select the best sperm cells for fertilisation. This ensures only sperm with superior morphology and motility are used for oocyte fertilisation.

5-Day (Blastocyst) Embryo Transfers for Improved Outcomes

EDU recommends transferring 5-day embryos instead of 3-day embryos, as they have a higher pregnancy rate compared to single embryo cultures on day three. This increases the potential for a successful implantation and live birth.

Tailored Treatment Plans for Individual Needs

EDU recognizes that every patient's journey is unique, and we tailor our treatment plans to your specific needs and preferences. We work closely with you to address any concerns and ensure you feel confident and supported throughout the process.

EDU's Crescendo

In 2012, EDU was born, not just as a service but as a maestro orchestrating the symphony of success. With a repertoire of over 800 fulfilled dreams, Our fertility clinic has proven to be the best in Kyiv, Because of our embryology lab and team of seasoned embryologists.
Our 86% live birth success rate with donor eggs is not just a statistic; it's a testament to the meticulous crafting of programs that alleviate stress and offer a 24/7 concerto of support.

Advocacy in Every Note

Choosing EDU is choosing advocacy rooted in cultural understanding. As a Westerner navigating the complex landscape of donor assisted IVF in Ukraine, we become your guide and advocate. In regions where doctors can't provide recommendations, we act as your compass, guiding you through the process from beginning to end.

The bigger issue is that doctors don't have time to caress each patient or suggest ways to increase their personal success rate. Let's remember that stress is the number one natural conception blocker. EDU provides tips and hacks on how to increase semen quality, prepare for pregnancy, which vitamins to take, what foods to eat and what not to eat. We are always versed on the latest research, what works and what does not.

Working with us, we remove the doubt and the necessity to worry about anything. This gives you the time and peace of mind to relax and prepare yourself for your embryo transfer.

Personalised Support for Every Concern

Every woman's journey is unique, and we tailor our support accordingly. EDU understands that you may have questions about donor selection, medical procedures, emotional well-being, and financial considerations. Our team is here to provide answers, address your concerns, and ensure you feel confident and supported throughout the process.
Start NOW with a free consultation

Chapter 1
Resources

Seven Things You Must Know When You Find Out You're Infertile

1. Don't let shame, fear, or embarrassment prevent you from asking for medical help to conceive.
2. Realize, consciously, that you are gambling your heart, not just your money, your time, and your body. For each try, it's probable that you'll either win big or face another painful loss on top of all the other many losses you've endured. It helps to realize this at the beginning.
3. Get a good therapist to help cope with the losses and all the ups and downs of the conception journey.
4. Keep busy and pursue other purposes in your life (for example, friends, work, hobbies, extended family, etc.).
5. If you are doing IUI or IVF, consider asking for time off under the Family and Medical Leave Act (FMLA), so you know you can miss work without worrying about losing your job.
6. Remember that money is a tool for you to earn, spend, and even borrow as you investigate your options based on your means, priorities, and personal values. Growing up, money problems always loomed on my horizon, and as an adult financial security is really important. I am very frugal and careful about finances. In order to decide IVF is right for you, you may need to shift your perception of money – remember, it's a tool to be used.
7. So many things about infertility are colossally unfair – try not to dwell on it; you'll drain your energy.

Infertility and the Emotional Aspects of Having a Child Through Donor Eggs

From our experience working with couples who are struggling with infertility, we have come to understand the painful transition a couple must go through in order to make a decision to use donor eggs. This is a difficult process, often plagued with anger, resentment, fear, and loss. However, there is a basic pattern that this transition seems to follow. The purpose of this section is to provide couples considering egg donation with an emotional roadmap to assist them in the process. By no means comprehensive, it is intended as an introduction so that couples may begin discussing the potential implications of their decision.

The following is a series of steps that most women and/or couples go through as they begin to consider egg donation. (Note: An assumption made herein is that the woman's egg quality and/or egg production is a contributing factor in the couple's infertility.) Your transition may not parallel these steps exactly, but you will likely travel through most, if not all, of these stages and experience many of these feelings somewhere along the journey.

Stage 1: The Hope of Success in Producing a Genetic Child Begins to Wane

After each failed cycle, the fear that you may not be able to bear a genetic child understandably increases. You may begin to ask yourself, "What if this doesn't work?" However, alongside your fear exists a continued hope and a strong desire to continue your pursuit to have a genetic child. Having a genetic child still seems possible and you continue on your course towards achieving that goal. You may vacillate between periods of optimism and periods of depression as you proceed through each cycle. Egg donation and adoption are not something that you consider during this phase.

Stage 2: Anger and Frustration Build Over Continued Failed Cycles

During this phase, you intensify your efforts and begin to pursue more and more aggressive medical treatments. Infertility now becomes the focus of your life. All of your decisions and plans are made within the framework of your monthly cycle and when you need to be available for procedures, inseminations, and transfers. There is mounting frustration over the large cost of continuing to make more attempts, and your resentment grows over the amount of investment that has not yet produced results.

During this stage, it is not uncommon for conflicts to arise within the couple over how much more each of you are willing (or able) to invest – emotionally and financially – in the pursuit of having a genetic child. The anger you have towards yourself (and your body) may increase, as well as the anger towards "other women" who seem to get pregnant so easily. You may no longer view yourself as "a complete woman," and despair may creep in as the fear that you will never be able to have "your own child" rises.

Stage 3: Initial Thoughts About Egg Donation Arise But Are Quickly Rejected

At this stage in the process, you feel that egg donation is synonymous with failure. Although you may recognize that other women are able to choose egg donation as a solution, you still view the process with skepticism and cannot accept it for yourself. You may fear that your family and friends will judge you negatively if you use an egg donor. You may also question the motivations of egg donors, suspecting that they are all financially desperate, unstable women who are donating just to make money.

Although egg donation is contemplated during this phase, the idea is rejected. The basis for this rejection typically stems from a core fear that you will not be able to fully embrace and love an egg donor child as your own. You may also consider adoption during this phase, but, again, adoption feels like an option that will not work for you. Having dismissed the alternative options of egg donation and adoption, you continue with your full-force efforts to produce a genetic child. Levels of frustration, depression, and despair rise as your attempts fail and your chances of success lessen.

Stage 4: Viewing Egg Donation as a Second-Choice Option

The ability to view egg donation as a second-choice option may offer you some relief, as it allows some hope that you will become a parent, even if you are not able to produce a child genetically. Since egg donation enables you to become pregnant (and gives you control over prenatal care and custody), you begin to view egg donation as a better option (for you) than adoption. The knowledge that your child will have half of a genetic link with its parents (if you are using your partner's sperm) may also be comforting to you.

As you begin to research egg donation, the information you uncover may help you to develop some confidence in the process. Your fear about the motivation and character of the women who donate their eggs begins to subside as you speak to others who have turned to egg donors for help. Seeing the donor as someone who is giving a gift becomes easier. However, new concerns may surface such as the fear that the egg donor will become emotionally attached to your child or that your partner will not view you as the child's mother.

You may wish that you could feel as positively about a donor child as you do a genetic child, but you do not. You still view egg donation as a second choice, a choice that will bring you less happiness. In this stage, it is difficult to imagine that a donor child will feel like "your child."

Stage 5: Giving Up

This is usually the most painful step in the process. In giving up, there is a sense of failure, loss, and deep despair. It seems that nothing will ever come close to being able to replace your genetic child. As you mourn the loss of your genetic child, you may view your future with bleakness and negativity, and you may wonder if you will ever recover from this loss.

It is common, during this phase, to reflect on your own genetic strengths and to anguish over the fact that these traits will not be passed down to your children. Without a genetic link to the future, you may feel a sense of disconnection. You may fear that your uniqueness in this world will "die out" and that nothing of your existence will last into the future. Subsequently, you may experience your current existence in the world as less significant. In addition to the loss of your genetic child, you may feel a loss of the opportunity to love the "baby you." The loss of the opportunity to love a part of you (your genetic child) in the way that you wish you would had been loved as a child is very painful.

Stage 6: Letting Go

This is the time where the couple says goodbye to the genetic child. Much of the mourning has occurred prior to this phase, and there is a sense of being able to move on and let go. Letting go brings relief. Although the goodbye is painful, it opens up a space for hopefulness. It opens up a space to welcome in the non-genetic child.

Stage 7: Welcoming the Egg Donor Child

As you search for the appropriate donor candidate and begin to identify donors with whom you are comfortable, you will likely feel a welcomed sense of renewed optimism. Your fears that you will not fully attach to the donor child (as well as your concerns about the egg donor possibly attaching to the child) fully abate as you develop a sincere appreciation for the donor and the gift she is giving you. As you reflect on some of the donor's characteristics, you may come to value many of her unique strengths, strengths that are not necessarily a part of your own genetic makeup (i.e., less heart disease in the family, more musical ability, etc.). As you near the end of your journey, you come to realize that egg donation is a good choice for you. You no longer feel that a donor child is inferior to having a genetic child, nor do you feel that it will bring you less happiness. You can acknowledge that you want this child (the donor child) as much as you wanted a genetic child.

Stage 8: Embracing the Donor Child as Your Own

From the very first sight of your newborn baby, you melt into the joy that is your child. As you hold your precious, fragile little miracle and take inventory of all her fingers and toes, you realize that this child is yours: yours to love and guide; yours to hold and comfort through the laughter, tears, joys, and sorrows; yours to impart your insights and wisdom; yours to prepare for the world in which she will live. This child is yours forever and always. The knowledge of her genetic origin serves only as a testimony to the wonders this life has to offer and to the extraordinary kindness of one very special woman who helped make your dreams come true.

Stress and Your Fertility

In today's modern, fast-paced society, it is easy for people to become stressed. In fact, one would almost think that being stressed is the "in" thing, and if you aren't stressed, it must mean there is something wrong with you! Realistically, however, stress is not a good thing for our bodies and has a very real impact on your fertility.

Can Stress Have an Effect on Your Fertility?

Believe it or not, our bodies are equipped to prevent conception from occurring during times of extreme stress. The presence of adrenalin – the hormone that is released by our bodies during stressful times – signals to our body that conditions are not ideal for conception. Adrenaline inhibits us from utilizing the hormone progesterone, which is essential for fertility. It also causes the pituitary gland to release higher levels of prolactin, which also causes infertility to occur.

How Stress Impacts Fertility

Recent research tells us that stress boosts levels of hormones such as cortisol, which inhibits the body's main sex hormones GnRH (gonadotropin releasing hormone) and subsequently suppresses ovulation, sexual urges, and sperm count.

GnRH is responsible for the release of luteinizing hormones and follicle-stimulating hormones by the pituitary and the suppression of testosterone, estrogens, and sexual behavior.

Chronic stress may cause a lack of libido as well as a decrease in general fertility. This has become such a common issue that they have created a name for it: "stress induced reproductive dysfunction."

These facts are very important to consider if you have been trying to conceive with no results. It also shows that stress relief should be a part of every couple's conception plan, even if they are going through IVF.

Trying to carry a pregnancy to term during stressful times places the fetus at risk. The body knows this, which is why it creates an environment that is basically inhospitable to conception. Generally, a stressed person is an unhealthy person. Women with stress are generally overly tired, filled with nervous tension, and may not be living a healthy lifestyle, eating properly, or worse.

Reducing Stress for Fertility

In you are having difficulty conceiving, stress may very well be a factor. If you have had fertility tests performed and have found that there is no medical reason for your infertility, it is time to evaluate your life and determine how much stress you have. Of course, you may not even need an evaluation. You may already know you are stressed. In that case, it is time to start defeating that stress to help your fertility.

There are many ways that a person can combat stress in an effort to increase their fertility. Stress is a powerful component in a person's life and can quickly run the body down. While some stress is completely natural and expected, too much stress will cause the body to go into survival mode so that your system can remain to function. Part of this survival mode is making sure you do not become pregnant, so if that is your ultimate goal, you will need to find some way to get rid of the stress safely and naturally.

How to Reduce the Effect of Stress on Your Fertility

1. Reduce the stress in your life. This, of course, is obvious, as well as easier said than done. But reducing the stress in your life is so important on so many levels. It will not only help your fertility and health but also your quality of life. If your job is really stressful, maybe begin to look for a different job or occupation. If that is not possible, some of the tips below will help you to deal with your stress differently.

2. Change how you react to stressful situations. When faced with an ongoing stressful situation, there is only one thing you have control over: how you react. Pay attention to how you react to the stressful people at work or to your stressful situation. Do you turn it over in your head all night long? Do you create scary future visions of what could happen? Gaining control of how you react will have a big impact on what happens inside your body when a stressful situation presents itself. This takes some attention and practice.

3. Have a practice or habit that helps reduce stress. Here are some suggestions of practices or daily habits that help reduce the effects of stress on your health.

- Make sure you are getting enough sleep
- Get an adequate amount of healthy exercise daily
- Meditate
- Start practicing yoga
- Seek counseling
- Consume natural, calming herbs and supplements
- Exercise
- Reading a book in the park
- Take warm baths
- Surrender and let go

4. Herbs help with stress.

Chronic stress may cause hormonal imbalance, lowered egg and sperm health, as well as create a lack of libido. Herbs that support healthy stress response, nourish the nervous system, and support endocrine function are important.

Ashwagandha root *(Withania somnifera)*
Both a nervine and adaptogen. Works to re-regulate thyroid and adrenal gland function. Supports overall endocrine system function for improved stress response and hormonal balance.

Bee Pollen/Propolis
Bee pollen has been reported to have great results in boosting immunity and fertility. Bee propolis has been found to support healthy immune, inflammation, and stress response in the body.

Chamomile flowers *(Matricaria recutita)*
This herb is a nervine and mild sedative; it may help to reduce stress, relax the nervous system, and induce a restful state in the body.

Eluthero root and stem bark *(Elueutherococcus senticosus)*
Strengthens the immune system. Great for people under severe stress. This herb helps people feel better, perform better, and recover from immune suppression more quickly.

Fo-ti, also known as **Ho Shou Wu** or He Shou Wu, root *(Polygonum multiflorum)*
According to traditional Chinese medicine, helps to restore jing (life essence). Supports both thyroid and adrenal function, both are extremely important and sensitive to stress. The vine and leaf are sometimes used to aid stress, nervous tension, and insomnia.

Lemon Balm leaf *(Melissa officinalis)*
Excellent nervous system support. Supports healthy stress response; lessens depression and anxiety. Good emotional health and stress response is important prior to conception. Not for use by people with hypothyroidism.

Linden flower and bract *(Tilia platyphyllos, T.cordata)*
Mildly lowers blood pressure, reduces depression, and supports nervous system function. Great for anxiety, depression, and insomnia; very gentle and safe.

Maca root *(Lepidium meyenii)*
Maca is a nourishing food for the endocrine system, aiding the pituitary, adrenal, and thyroid glands (all involved in hormonal balance.) Supportive of both immune and stress response on the body.

Motherwort aerial parts *(Leonurus cardiaca)*
Famous herbalist Nicholas Culpepper 1616-1654 said, *"There is no better herb to drive away melancholy vapours from the heart, to strengthen it and make the mind cheerful."* Supports heart health, reduces anxiety.

Schisandra, fruit and seed *(Schisandra chinensis)*
Adaptogen, supports healthy hormonal balance through endocrine system support. Promotes proper immune and stress response.

Shatavari root *(Asparagus racemosus)*
Not only does this herb support healthy fertility, it is an immune system and nutritive tonic. Supports overall immune system function.

5. Books that have helped transform stress. I have previously gone through a lot of stress. While I still experience stressful things in my life, I have learned from others how to live in peace despite outside circumstances. One of the places I have learned this peace is through books. Many books have made a huge difference in how I react to stressful situations.

6. Avoid harsh checmical medications. In an effort to reduce and remove stress from your life to achieve fertility, it is important that you try to avoid harsh chemical medications that are prescribed to help individuals become less stressed. These medications merely mask the stressful feelings you are experiencing and do nothing to help the situation. Additionally, some of these medications can cause infertility themselves or have a negative effect on your fetus if you do happen to become pregnant.

7. Use Emotional Freedom Techniques (EFT) to help you. Trying to conceive can be tiring both physically and mentally. It affects your spirit, mind, and body. As a result, I would like to introduce you to a helpful and easy technique based on ancient Chinese medicine. In theory, it is very similar to acupuncture. The theory behind this technique is that when a person's emotions are tightly wound up, it affects their physiological condition. Therefore, by relieving the stress and freeing up the emotions, a change is brought about in the physiological condition of a person, hopefully helping her to conceive.

This technique is wonderful because it addresses both fertility and stress reduction at the same time. EFT is also a highly effective technique at removing psychological blocks to conception. Past traumas, memories, and beliefs about pregnancy, birth and parenthood can all affect how you truly feel about having a baby. You may feel ready to be a parent, but are there any hidden blocks that are stopping you from conceiving? EFT helps you identify and resolve these blocks and move you towards having your baby.

relax. breath. peace.

7 Steps to Get Your Body Baby Ready

Deciding to get pregnant is an exciting time in life, you have made the decision that you are ready to bring forth new life! Even though you are mentally ready, is your body? It is easy to get caught up in the daydreams of pregnancy and what your baby will be like, but have you thought about what important steps can be done to improve your chances of a healthy pregnancyand baby? Are you prepared for conception and what comes after?

Why should you prepare for pregnancy? The body will be carrying extra weight, close to double the blood volume, and will require a lot more energy from all parts of the body to grow a baby and sustain pregnancy. So what can you do to get your body baby ready? Let us share with you these simple steps for healthy pregnancy preparation.

1. Learn How to Eat Better: Nourish!

Start eating better. You can do this by learning how to eat a natural fertility diet. What you eat will not only be fuel for your body, but it will help form your baby. Choosing a wide variety of healthy, organic whole foods is going to be best.

Here are some simple guidelines to eating for a healthy baby ready body:

- Eat a lot of organic vegetables and fruits
- Eat organic, grass-fed, whole-fat, raw dairy
- Try to eat mostly cold water fish
- Choose meat that is free range and/or grass fed and organic
- Eat only grains in their whole, natural form
- Eat high fiber foods with each meal
- Avoid non-fermented soy foods
- Avoid refined sugars or fruit juices
- Drink a lot of clean water

2. Cleanse and Detoxify

Over time, the human body accumulates environmental toxins from car exhaust, chemical pollution, plastics, food, and more. While the body may be able to remove some of these, many toxins may be stored in the liver, kidneys, and fat cells. During pregnancy and breastfeeding, the body will use fat stores to provide sustenance for the baby, which means these toxins may go directly to baby. This is why it's important to try to cleanse the body of toxins prior to conception and breastfeeding.

Changing the way you eat is the first step in cleansing the body of these toxins. The second step is fertility cleansing. Fertility cleansing prior to conception may aid the body in quickly flushing toxins through the use of supportive herbs. This special type of cleanse focuses on liver and fat cell detoxification, while also supporting uterine health in preparation for implantation. The third step in cleansing brings us to exercise.

3. Exercise

Exercise promotes two avenues of natural detoxification: sweat and circulation. On top of the cleansing benefits of regular exercise, pregnancy and labor require a strength unlike other times in your life. To get your body into shape for pregnancy, women who are trying to conceive need to exercise regularly at a moderate level, for 30 minutes a day three times a week, with two 30-minute strength training sessions. Some days could include one to two sessions of yoga for an hour.

Great ways to get your body toned and ready for a baby:

- Brisk walking, five times a week, for 30-60 minutes
- Two to three one-hour sessions of fertility yoga
- Dancing
- Nia, two to three times a week
- Zumba, two to three times a week
- Aerobics, two to three times a week
- Leisurely bike riding
- Light jogging
- Swimming

4. Take a Whole Food Prenatal Vitamin

There are a variety of vital nutrients that may be missing from a person's regular diet. Experts agree that women who are trying to conceive should be preparing for pregnancy by taking a multivitamin. Not all multivitamins are equal, however. We find that the nutrients in your prenatal vitamin should come from whole foods. For the body, the nutrients in a prenatal vitamin made from whole foods are easier to break down, assimilate, and utilize.

Across the world, nutritional deficiencies such as lack of folic acid are still the number one cause of preventable developmental defects in babies. A whole food prenatal vitamin is going to ensure that you are getting required nutrients for pregnancy. This doesn't mean you don't need to eat well though. A prenatal vitamin bridges the gap in nutrition to make sure you are achieving complete nutritional levels required for pregnancy.

5. Work to Eliminate Bad Habits

Alcohol, smoking cigarettes, and drinking caffeine have all been shown to lower fertility and are going to have to be stopped during pregnancy. Plus, they are just plain unhealthy habits. It's not like you don't know this already, but still, it really would be best to cut these out before trying for a baby. This will make it easier on you once you are pregnant. In addition, eliminating these now may even boost your chances of conception. Studies show that these unhealthy substances may cause hormonal imbalance, poor stress response, and may even delay ovulation. So ditch those bad habits as soon as you can. You will be happy you did!

6. See Your Gynecologist

Get a full pelvic and breast exam before trying for a baby. This will help to identify and take care of any potential issues. It is best to know whether there are any issues before getting pregnant; that way, they can be taken care of prior to pregnancy. It is more difficult to treat reproductive health issues during pregnancy, and issues like infections or STDs may be harmful to an otherwise healthy pregnancy.

7. Create Calm by Reducing Stress

Humans easily get caught up in the ever quickening pace of life. Have you taken time today to create a space in which to lower your heart rate, take a deep breath, and check in with your stress levels? If not, that is something that may greatly benefit the health of your body each day. Physical, mental, and emotional stressors may all negatively impact health. Stress management practices should be part of preparing the body for pregnancy. Elevated stress levels have been shown to contribute to hormonal imbalance through endocrine system disruption.

Pregnancy can also be stressful on the body. Having a stress management practice prior to pregnancy will allow for you to easily check in with how the body is feeling throughout pregnancy. A woman who has already created this habit prior to pregnancy will be better able to continue stress management techniques during pregnancy.

Consciously make time each day to practice lowering stress. Great ways to reduce stress include meditations, exercise, prayer, journal, yoga, getting out in nature, counseling, and getting together with friends.

IVF Do's and Don'ts

Here is the list of things to do during IVF (in-vitro fertilization) treatment:

Understand the process: Being aware and knowing about the IVF process results in you being personally confident to undergo IVF as it is a complex process with a sequence of procedures to achieve pregnancy. IVF takes two weeks to finish one cycle. A process called egg retrieval is involved in IVF, where a woman's eggs are retrieved from the ovary and are fertilized with a sperm which results in an embryo. Once the embryo is developed, it is again transferred back into the uterus which results in pregnancy.

Understand your hormone levels: It is vital to know that your hormones will be on edge during the whole process; it will feel like you're on a roller coaster ride as you deal with unusual bouts of sadness, anxiety, and uncertainty when you have to make major decisions. Understand it is all normal under the current situation, though it cannot be avoided but can be minimized if you can bring it under control.

Follow the instructions: It is always advisable to follow the advice of the doctor with regards to your food choices, sleep patterns, and the kind of medicines that you must take regularly for the IVF treatments.

Keep an eye on insurance policies: IVF treatments can be costly and can make a dent in your finances. But don't worry. There are several beneficial insurance policies out there to cover the majority of the expenses. Take a well-informed approach on considering a policy before opting for IVF treatments.

Get support: Never hesitate to ask for psychological support. Never neglect the state of your mental health. You will be experiencing a multitude of emotions with each one crying for individual attention, and it is vital to address them all one by one. Talk to your family, friends, and psychiatrists if you ever need someone to share stuff that is bothering you. They will be more than ready and present to offer you the help that you long for.

Reduce stress: As you begin to consider IVF treatments, cut back on all types of stress that drain you. Take remedial steps to battle stress by meditating, listening to positive and uplifting music, watching inspiring videos, and practicing a hobby.

Here is the list of things to NOT do during IVF treatment:

Avoid substance use: It is highly important to avoid smoking, drinking, and taking drugs that are not prescribed during the treatments to ensure the success rate. Therefore, stay away at all costs.

Don't neglect your state of health: It is so common to forget taking care of yourself while making other important choices. Try to stay fit, eat healthier food, maintain a balanced diet, and don't forget the essential vitamins.

Don't disregard or take advice lightly: Follow the expert physician's advice word for word. They are knowledgeable and know the process in and out. Listen carefully and follow it.

You are now aware of the list of do's and don'ts of the IVF process. This list will be helpful before deciding to go for IVF treatments. But during the IVF process, there are some do's and don'ts you

have to follow to ensure maximum success. The entire list of do's and don'ts during the IVF process can be divided into three sections or phases. The phases are the pre-cycle phase, mid-cycle phase, and post-cycle phase.

Pre-cycle Phase:

The goal should be fully focused on maintaining your healthiest state of both body and soul.

Your diet must contain some fruits, nuts, green leafy stuff, lots of veggies, and of course meat that is rich in zinc if you are a meat lover.

Drink water. Drink a lot of it to maintain a healthy state of living. Stick to a schedule that enables you to drink at least eight glasses per day on average at a minimum.

Avoid food that can cause food poisoning such as raw eggs.

Do not include artificial sweeteners in your drinks or consume a drink that has one as a listed ingredient.

Avoid excess doses of caffeine and keep away from alcohol.

Avoid smoking. Stay away from tobacco and marijuana.

Mid-cycle Phase:

Ensure that you are getting at least eight hours of rest. Sleep is vital for your body, so do not miss out on having the necessary sleep.

Ensure a healthy level of fluids by drinking an adequate quantity of water.

The no smoking and no alcohol rule continues in this phase too.

Do a moderate to low impact exercise routine.

Avoid cardio exercises, especially bicycle riding, if you have to provide semen for the IVF cycle.

Remember that for some couples it takes multiple attempts to achieve a successful outcome. So never give up on IVF after the first attempt if it is unsuccessful.

Do not listen to people who tend to focus on the negative aspects; each couple will undergo a different process and follow a different lifestyle.

Post-cycle Phase:

You deserve a treat for following all the do's and don'ts of fertility treatment thus far; treat yourself with a spa day or a women's night out. But do not use public hot tubs or Jacuzzi's

Talk and share about everything going on in your life with your partner.

Try to relax as much as possible and avoid all kinds of stress. Stress produces high levels of cortisol. Cortisol and other hormones can prevent implantation of fertilized

eggs. Stress can also mess up your cycles. You may end up ovulating a few days before menstruating.

To avoid miscarriage and other fertility-related risks, do not take a bath in a hot tub or undertake a hot sauna after the transfer of the embryo, as both of these tend to increase the average body temperature and can cause unnecessary complications which can be avoided.

Since there are possibilities of light bleeding after the retrieval of the egg, do not use tampons, but you can use menstrual pads and maintain proper hygiene.

You can avoid bloating by consuming water and other alternatives such as coconut water and liquid IV or drinks that are low in sugar.

In addition to eight hours of sleep, take plenty of naps ranging from 30 to 45 minutes. This will help you feel refreshed, stay alert, and focus on important tasks to complete for the day.

Apart from this, follow the physician's advice regularly. This elaborative list of do's and don'ts applies to any kind of fertility treatments that you and your partner decide to opt for. So don't lose heart and never give up on hope; keep doing what you must do and don't stress much.

Surrogacy and IVF

You might question what the major difference is between surrogacy and IVF. Notice that there is a world of difference. The babies conceived through in-vitro fertilization are known as "test tube babies." In surrogacy, babies are conceived when a woman is artificially inseminated with the intended sperm and this woman carries as well as delivers the baby for the intended couple to raise the baby as their own child. Surrogacy is typically an arrangement between a woman and a couple where the woman agrees to carry the baby in her womb until delivery.

Usually, in a standard IVF procedure, the fertilized egg, which is initially retrieved, is then transferred and placed in the womb of the biological mother from where the egg was retrieved in the first place. Contrary to this, in surrogacy, the fertilized egg is placed in the womb of the woman who has agreed to bear the child and not in the biological mother. The surrogate mother may agree to do it for reasons that vary from monetary to altruistic intentions. There are few countries that prohibit surrogacy for profit and India is among them.

There are a few details to pay attention to where maintaining a healthy diet is of prime importance. Include a lot of whole grains in your diet like quinoa, faro, and whole grain pasta, and don't forget to include legumes, lentils, chickpeas, and beans. Eating healthy fats is highly encouraged; this includes virgin olive oil, nuts, avocado, etc. Highly processed foods and red meat must be avoided at all cost.

In addition, meditating and visualizing all that happens in your body with the transferred embryos might induce positivity and optimism to make things work out just the way you wish it to happen.

Gestational Surrogacy: Is the Baby Related to the Surrogate?

Gestational surrogacy is the more common way to complete surrogacies today. In this situation, the baby does not get any genetics from a surrogate mother; an embryo created from the intended parents' sperm and egg (or using a combination with a donated gamete) is transferred to the surrogate's womb, where she carries the baby to full term.

DNA is passed from parent to child. When a woman carries a child that came from a donor egg (not of any blood or genetic relation to the woman), due to her blood being the same blood that pumps through the heart of the fetus inside her, does that fact change or alter the DNA of the fetus/child to show any blood or genetic relation to the woman who carried that fetus/child?

A woman who carries someone else's baby contributes very little, if any, DNA to the child. This is because the child already has its DNA from its mom and dad. Also, the baby's own blood passes through its body, not the blood of its surrogate mom.

However, there *is* a possibility that some DNA could be transferred from the woman to the fetus that she is carrying. And vice versa, from the child to the mother.

This exchanged DNA will have almost no effect. At most, it will be a few cells (with DNA) hiding out amongst the trillions of original cells of the child. Too few cells of the surrogate mother are passed to the child for them to actually pass on any of her characteristics or affect the child in any significant way.

Remember, a child's DNA comes from two places: half from its mother and half from its father.

But here, we're talking about changes in DNA that happen during pregnancy, while the child is developing. So, all of what is discussed is true for both mothers carrying their own child, as well as for surrogate mothers carrying the child of another woman.

The Placenta: Nature's Screen

A baby forms from an egg (from the mom) that is fertilized by a sperm (of the dad). The fertilized egg divides and divides to eventually become the child.

In addition to forming the child, it also forms something called the placenta. The placenta is attached to the inside of the uterus of the mother. The placenta then connects to the baby by its umbilical cord. (Your umbilical cord used to be where your belly button is.)

The placenta is very important because it acts like a filter. The placenta prevents much of the DNA from passing between the mother and the child.

The placenta serves as an interface between the mother and the developing fetus and has three main jobs: 1) Attach the fetus to the uterine wall, 2) Provide nutrients to the fetus, and 3) Allow the fetus to transfer waste products to the mother's blood.The placenta allows nutrients that the baby needs to pass from the mother to the baby. The placenta also carries waste that the child doesn't need back through to the mother. But the placenta doesn't let blood or other cells from the mother or child pass through.

This means that, in theory, no DNA gets through either, since DNA is inside of cells. For the most part, the surrogate mom's DNA stays on one side of the barrier and the baby's on the other.

So, blood, cells, and DNA don't pass directly between the mother and child. Just the important things inside the blood do.

This is a good thing. If too many cells from the mother get inside the child, it could be dangerous for the child. A lot of cells from the child passing to the mother could be dangerous for the mother, too. This is why the placenta doesn't let many through.

Nothing is Perfect

Of course, nothing in life is completely perfect, and this includes the placenta.

Sometimes cells can get through the placenta. This can happen in both directions – from the mother into the child, and from the child into the mother.

It is a bit more common for DNA from the child to get into the mother. But cells from the mother can get into the child as well, carrying along the DNA of the mother.

At one time, this was thought to be very rare. However, some recent studies have found a few cells from the mother pass into the child in around 40 percent of pregnancies.

But just like your screened-in room isn't full of flies, the baby is not chock-full of DNA from the woman carrying it. The few cells that sneak through the placenta have the surrogate mother's DNA, but that's it.

If these cells stick around, scientists call it "fetomaternal chimerism." But, only a few mother cells usually do.

So, in comparison to the trillions of other cells of the baby, the cells that sneak through don't have much of an effect. (Some studies have suggested that they might make autoimmune diseases more likely, but this research is still at an early stage.)

The bottom line is that once an egg is fertilized, the woman carrying the fertilized egg does not contribute a significant amount of DNA to the fetus. But she could still affect how that DNA is eventually used. This can affect the child for the rest of his or her life. And the effects could even be passed down to grandchildren!

Scientists call these other effects epigenetics.

Surrogacy Myths and Facts

There are many misconceptions and myths surrounding surrogacy and working with a surrogate/gestational carrier. If you are in the fact-finding stage, read on as we debunk common surrogacy myths and break down the facts.

Surrogacy Myth: Surrogacy is only for the wealthy or celebrities.

Busted: This myth exists because the cost of surrogacy is almost indeterminable. Surrogate fees and expenses vary substantially depending on several factors such as whether the mother (intended parent) is using her own eggs or will she need the help of an egg donor. Are there agency fees or do they have a friend or family member who is willing to carry their baby? The cost of medical care and health insurance is also a huge factor to consider as there are some insurance carriers that exclude surrogacy, in which case, the parents must purchase a policy that is specifically for surrogacy that costs about $30,000. However, there are some surrogate mothers who have excellent health insurance that does not limit or exclude surrogacy – in these cases, there is little or no cost to the parents for any maternity, labor, or delivery of their baby. There are also select fertility centers that offer in-house financing, payment plans, or cash discounts to assist their patients.

Surrogacy Myth: A woman will opt for surrogacy to save her figure or avoid pregnancy.

Busted: Surrogacy is a very emotional and expensive process for a woman to have a baby. A woman typically chooses surrogacy after multiple failed attempts and methods to conceive and carry a baby herself. The decision to continue on to surrogacy is almost always a last resort. There is little to no truth to a woman going through surrogacy to keep her figure. Most women who want to be a mother do not care about the temporary weight gain. Having a family is the most important aspect of their lives and our number one priority. Surrogacy is about one woman helping another woman enjoy parenthood, and it has nothing to do with the mom-to-be's concern for her physical appearance.

Surrogacy Myth: The surrogate may try to take on parental custody of the child.

Busted: Most fertility clinics will request that both the intended parents and the surrogate (and her partner/spouse) undergo a psychological evaluation prior to entering into a surrogacy agreement. If this is not required, it is a good idea to consider it. Working with a reproductive law attorney will also be able to provide you guidance on the state laws surrounding surrogacy and confirm whether that particular state will recognize the intended parents for the child's parentage. Although the surrogate will nurture your child throughout the pregnancy, surrogates and gestational carriers are aware from the onset that they will not parent or have legal parentage rights of the child.

Surrogacy Myth: I will have trouble bonding with my baby.

Busted: Bonding with the child after birth is something that many intended parents worry over leading up to the pregnancy. The bonding process begins after the child is born, not while in the womb. Once the child is born, he/she is immediately handed over to the intended parents where that bond will begin to form. It is those who nurture and love on the child that secure the forever bond.

What is “Donor Eligibility Determination”?

A donor eligibility determination is based on donor screening and testing for relevant communicable disease agents and diseases. A donor eligibility determination is required for all donors of cells or tissues used in artificial reproductive technologies (ART).

The donor screening and testing encompasses the following:

1. Syphilis (TPHA+reagin AT)
2. Hepatitis B (kilkisny HbsAg)
3. Hepatitis C (HCV загальні AT)
4. HIV
5. Toxoplasmosis IgM
6. Cytomegalovirus IgM
7. Herpes1/2 IgM
8. Rubella IgM
9. Karyotype
10. X-frag. Chromosome
11. Cystic Fibrosis
12. Chlamydia Virus PCR
13. Mycoplasma (genitalium, hominis), ureaplazma ПЛР
14. Urogenital smear
15. Pap smear/ cytology
16. CBC
17. Blood group and Rh
18. Coagulogram
19. Biochemical analysis of blood (including liver tests)
20. Glucose
21. Urine test
22. Prolactin
23. FSH
24. Thyroid-stimulating hormone
25. AMH
26. Onco-markers CA-125 / CA-153 / HE4 / CA-199
27. Conclusion of psychologist
28. Fluorography
29. Mammography
30. Conclusion of pediatrician about children’s health

Blastocyst Embryo Transfer

What is a Blastocyst?

A blastocyst is an embryo that has developed in culture in the IVF laboratory for at least five days after egg retrieval and has divided into two different cell types. The surface cells are called the trophectoderm and will eventually become the placenta, and the inner cells, called the inner cell mass, will become the fetus. A healthy blastocyst should hatch from its shell (zona pellucida) by the end of six days or earlier and is then ready to begin to implant within the lining of the uterus.

Blastocysts have survived an important "survival test." During the first few days, the embryo relies on the egg cell (from the mother) for all its growing nutrients. However, in order to survive past day three or four, the embryo must activate its own genes so that it can carry on growing and dividing. Unfortunately, not all embryos are able to grow past this milestone, and in fact, only about one-third of embryos are capable of becoming blastocysts. If an embryo can propel itself into becoming a blastocyst in vitro, then it would appear that nature has sent us a message that these embryos are the product of a "survival of the fittest" test.

There is now abundant evidence that transferring blastocyst embryos into the uterus five or six days after egg retrieval results in higher implantation rates per embryo transferred compared to a day three embryo transfer. An embryo reaching the blastocyst stage has an increased chance of implantation as opposed to a day three embryo (all things being equal regarding a healthy uterus). It is believed that the improved implantation rates following a blastocyst transfer is due to selection of the "best" embryos.

Growing Embryos to Blastocyst Stage

Traditionally, in an IVF cycle, embryos were transferred to the uterus on the second or third day of development and initial embryonic cell division. EDU Fertility's embryology team has moved systematically towards refining the techniques in the laboratory which now enable many of our patients to avail themselves to transferring blastocysts as opposed to the older, more traditional methodology of day three transfers. IVF practitioners were aware that day three embryo transfers were too early when compared to what happens in naturally conceived pregnancies. In a naturally conceived pregnancy, the embryo reaches the uterus on day four or five because it grows and divides in the fallopian tube for several days after fertilization.

Previously, laboratory culture media could only sustain an embryo's growth for about three days in vitro. Research throughout the late 1990s identified that as the embryo develops, its nutritional requirements change due to metabolic factors. This research led to the development of different laboratory culture media for the embryo's specific developmental stages.

EDU Fertility is fortunate to have an embryology team that is highly skilled and a laboratory that is technologically advanced. It requires much more time and effort to sustain the dynamic process of embryo development to blastocyst stage. Our embryologists use specific media to facilitate the embryo's development to the blastocyst in vitro during their first three days in culture inside the IVF laboratory.

This newer "sequential media" attempts to reproduce the natural environment of the maternal reproductive tract. These blastocyst culture conditions do not improve the health or viability of an individual embryo – sequential media does not transform a poor embryo into a good embryo, but rather it allows embryos capable of sustained growth to continue growing in the culture media

and reach their maximum inherent capability. The ability to develop embryos to the blastocyst stage allows our embryology team to have greater certainty about which embryos are more likely to implant.

Grading Blastocysts

Blastocysts themselves have their own inherent morphology quality standards. EDU Fertility uses a standard blastocyst scoring system.

This blastocyst grading system assigns three separate quality scores to each blastocyst embryo:

- Blastocyst development stage – expansion and hatching status
- Inner cell mass (ICM) score, or quality
- Trophectoderm (TE) score, or quality

Expansion grade; blastocyst development and stage status:

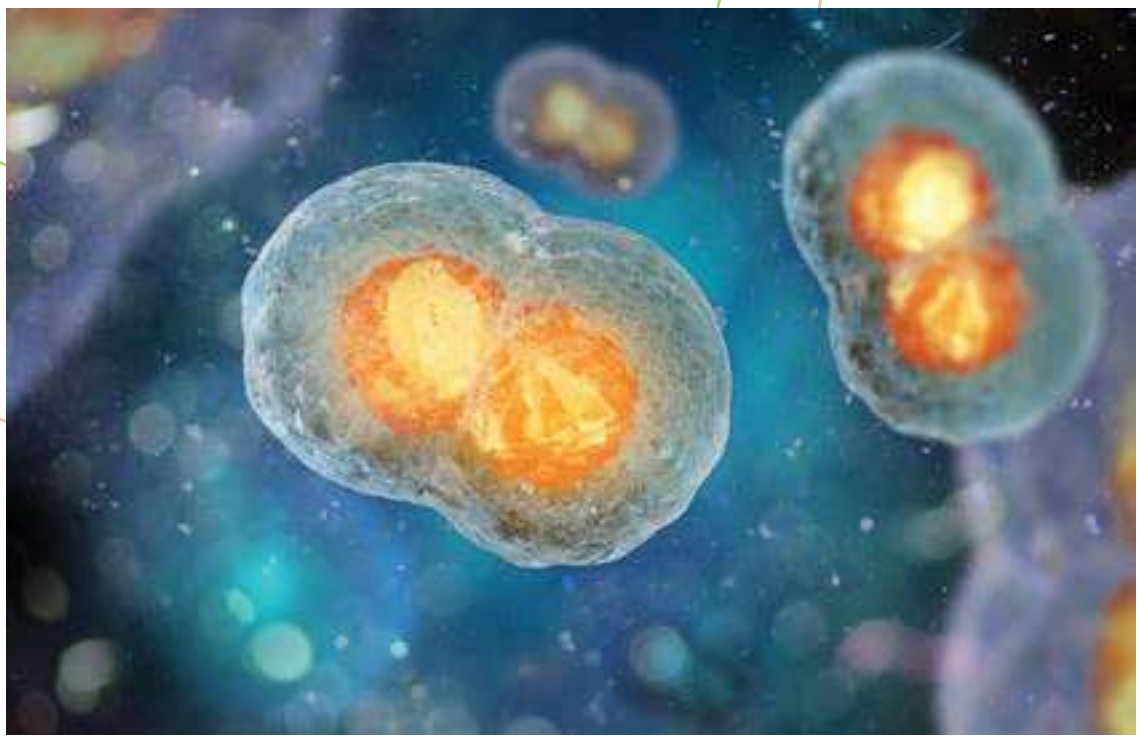
- 1 Blastocoel cavity less than half the volume of the embryo
- 2 Blastocoel cavity more than half the volume of the embryo
- 3 Full blastocyst, cavity completely filling the embryo
- 4 Expanded blastocyst, cavity larger than the embryo, with thinning of the shell
- 5 Hatching out of the shell
- 6 Hatched out of the shell

ICM grade; inner cell mass quality:

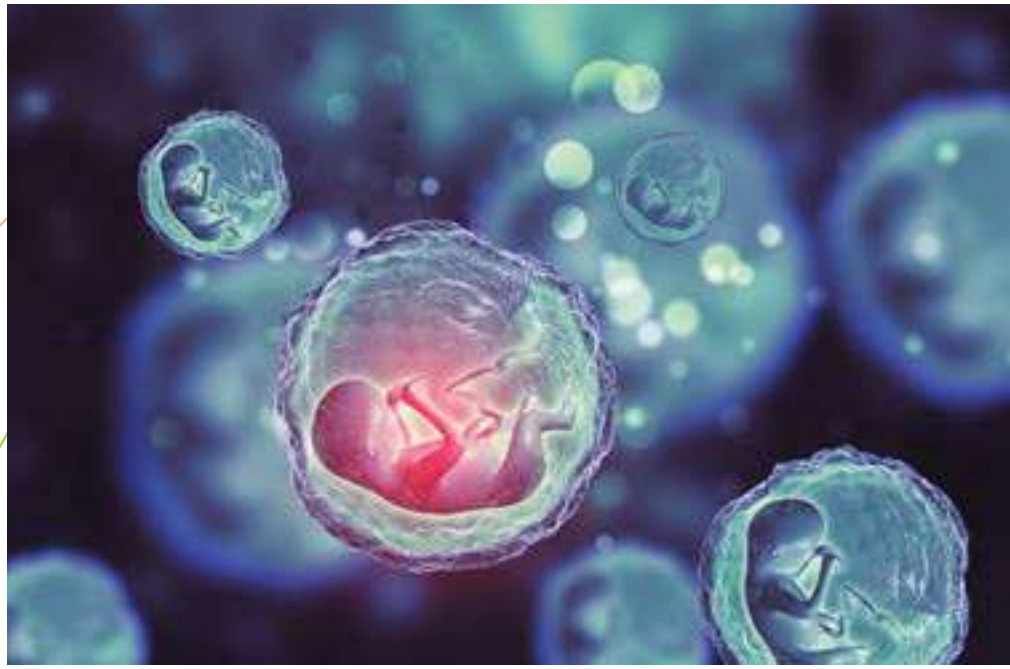
- A Many cells, tightly packed
- B Several cells, loosely grouped
- C Very few cells

TE grade; trophectoderm quality:

- A Many cells, forming a cohesive layer
- B Few cells, forming a loose epithelium
- C Very few large cells



Is Blastocyst Transfer Right for All Patients?



In general, a blastocyst or embryo transfer procedure is more advantageous for patients who develop a large number of eggs and embryos. Because only some embryos are capable of developing into blastocysts, it is possible to have no embryos survive to day five to transfer. This is especially true if the cycle begins with few eggs and embryos. The question as to whether the embryos that did not grow into blastocysts could still have implanted if they were transferred on day three is not able to be definitively answered at this time. In patients with few embryos on day three or where no embryo selection is needed, it is still a rational approach to perform a day three transfer (if the patient wishes to do a transfer on their first fresh cycle) as opposed to trying to grow these few embryos to blastocysts and then potentially having no embryos to transfer.

At EDU Fertility, however, many of the patients who are regarded as "poor prognosis" in terms of their ultimate success rate for IVF choose to undergo what we term "embryo banking" cycles. These patients do several cycles in which we accumulate embryos for them and when we have gathered about eight or nine embryos, the patient will have a combination fresh/frozen transfer cycle. The embryos that are frozen will be thawed and, in combination with the fresh embryos, all the resulting embryos may undergo PGD (not mandatory) on day three of in vitro culture (see section on Preimplantation Genetic Diagnosis (PGD) for full explanation).

One of the major limiting factors with doing well with this type of treatment (besides the normal versus abnormal results of the PGD) is the ability of the IVF laboratory to sustain the embryos' growth in the incubators while PGD is being performed and to enable those embryos that are inherently capable to continue to grow to blastocysts.

Frozen Blastocyst Transfer Cycles

At EDU Fertility, blastocysts have a good survival rate after freezing. The optimization of a blastocyst cryopreservation program mandates a comprehensive approach. An appropriate embryo culture system with attention to the protein supplement and a low oxygen environment has been shown to increase the number of blastocysts available for cryopreservation and improve the quality of the inner cell mass and blastocysts post-thaw survival rate.

Blastocyst Embryo Transfer and the Future

Over the past several years, patients at EDU Fertility have completed hundreds of fresh and frozen blastocyst embryos transfers. The average success rate in patients under the age of 35 is 46.8 percent. In our egg donation and surrogacy cases, the ongoing pregnancy rate is over 80 percent per transfer using blastocysts. These results are being achieved in our program by us routinely transferring a maximum of two blastocyst embryos. This option has dramatically lowered the risk of patients having to deal with the stress, adversity, and dilemma of carrying higher order multiples (triplets or more). Our embryology team is constantly upgrading both laboratory equipment and their expertise, and we are confident that these advances will ultimately translate into even higher pregnancy rates for patients.

Fresh vs. Frozen Embryos for Women with Polycystic Ovary Syndrome

Background

The transfer of fresh embryos is generally preferred over the transfer of frozen embryos for in vitro fertilization (IVF), but some evidence suggests that frozen-embryo transfer may improve the live-birth rate and lower the rates of the ovarian hyper stimulation syndrome and pregnancy complications in women with the polycystic ovary syndrome.

Methods

In a multicenter trial, we randomly assigned 1,508 infertile women with polycystic ovary syndrome who were undergoing their first IVF cycle to undergo either fresh-embryo transfer or embryo cryopreservation followed by frozen-embryo transfer. After three days of embryo development, women underwent the transfer of up to two fresh or frozen embryos. The primary outcome was a live birth after the first embryo transfer.

Results

Frozen-embryo transfer resulted in a higher frequency of live birth after the first transfer than did fresh-embryo transfer (49.3% vs. 42.0%).

Women who underwent frozen-embryo transfer also had a lower frequency of pregnancy loss (22.0% vs. 32.7%) and ovarian hyper stimulation syndrome (1.3% vs. 7.1%), but had a higher frequency of preeclampsia (4.4% vs. 1.4%).

There were no significant between-group differences in rates of other pregnancy and neonatal complications. There were five neonatal deaths in the frozen-embryo group and none in the fresh-embryo group.

Conclusion

Among infertile women with polycystic ovary syndrome, frozen-embryo transfer was associated with a **higher rate of live birth**, a lower risk of the ovarian hyperstimulation syndrome, and a higher risk of preeclampsia after the first transfer than was fresh-embryo transfer.

Body Mass Index and Its Effect on Infertility and IVF Success Rates

Background

A woman's weight can affect her fertility. We know that at both extremes – very thin and obese – that there can be disruption of the normal process of regular, consistent ovulation. Anovulation can often result. Medications can be used to induce ovulation in these women in an attempt to become pregnant.

Body mass index, or BMI, is an index of a person's relative "skinniness or heaviness." The BMI factors in a person's weight and their height to give an overall "index."

A High BMI Indicates Obesity

- Normal body weight is BMI between 18.5 - 24.9
- A BMI under 18.5 indicates that the person is "underweight"
- A BMI of 25.0 - 29.9 indicates that the individual is "overweight," but not obese
- A BMI over 30 indicates obesity
- A BMI over 40 indicates extreme obesity

Obesity is associated with increased risk for several serious disease processes. Extreme obesity is associated with a dramatically increased risk for many serious diseases.

How BMI is Calculated

- weight (in kilos) divided by height (in meters) squared

Therefore, if someone weighs 100 kilos and is 1.8 meters tall, their BMI is 100 divided by 1.8 X 1.8 = 100/3.24 = 30.9.

To convert from pounds to kilos, take the weight in pounds and divide it by 2.2.

To convert from inches to meters, take the height in inches times 0.0254.

View a BMI table showing how to get your BMI from your height and weight.

Some recently published studies have shown a relationship between BMI and in vitro fertilization success rates. We have reviewed other IVF data and found that increased body weight (BMI > 30) has a significant negative effect on IVF pregnancy success rates.

Bottom Line

If you are overweight (BMI over about 28) and having trouble getting pregnant, try to lose weight. If you have irregular menstrual cycles (anovulation, or irregular ovulation) and you are overweight, weight loss might make your cycle regular, thereby making you more fertile.

If you are obese (BMI of 30 or higher) and are interested in IVF, you might have a significantly improved chance for success if you reduce your weight before going through the procedure.

Body Weight and Safety of IVF Procedures

Another issue related to body weight and IVF is safety for the patient at the egg retrieval stage. As can be seen in ultrasound images, when a woman is significantly overweight, the ovaries are usually pushed up "high," away from the top of the vagina by the extra fatty tissue that is in the pelvis.

At the time of IVF, the needle is pushed in vaginally to reach the eggs in the ovaries. If the ovaries are too high, it will not be safe or easy get the needle into the follicles to get the eggs out.

Another problem is that the ultrasound images become very "fuzzy" from the extra tissue between the probe and the ovary. Therefore, it is often difficult to clearly visualize the ovaries and the egg-containing follicles.

The Most Important Hormone for Assessing Ovarian Reserve

If you're reading this, perhaps you've already done some thinking about your fertility and eggs. Maybe you've even asked your gyno (or Google – hey, we've all been there) about fertility testing to learn about your hormones and how they can influence fertility. The world of hormone fertility testing (complete with a bunch of acronyms that'll make your ovaries spin) can be super overwhelming. What should you get tested, when, and what does it all mean?

You're in the right place. We're here to break it down for you.

The Details on Your Eggs

In this section, we'll primarily be talking about why and how certain hormones can be an indicator of ovarian reserve. This is one big way your hormones can help you better understand your fertility. Ovarian reserve is the term that refers to your egg count – how many eggs you have in your ovaries that can potentially be fertilized by sperm and result in a pregnancy. Over time and as you age, your egg count decreases. This ovarian reserve decline happens at a faster rate the older you get, too.

There are three hormones that can indicate ovarian reserve: AMH (Anti-mullerian hormone), FSH (follicle stimulating hormone), and E2 (estradiol).

Studies show AMH is the best indicator of ovarian reserve. Your AMH levels (low, normal, high) directly correlate to the number of eggs remaining. FSH can also detect ovarian reserve, but it's important to check E2 along with it because high E2 levels can suppress FSH. Meaning, if your FSH levels are suppressed by E2, this FSH measurement may not accurately represent your ovarian reserve. FSH and E2 are kind of like Thelma and Louise or Lucy and Ethel – they influence each other and need to be tested together to get the clearest, most accurate picture of ovarian reserve.

So, which is better – AMH or FSH and E2?

AMH is considered a superior ovarian reserve test to FSH because it can detect ovarian changes a bit earlier in life. Additionally, while your FSH levels can vary throughout your cycle and from month to month, AMH is more consistent than FSH.

Bottom line? AMH is one of the very best ovarian reserve tests. However, to get the most holistic and complete picture of ovarian reserve and fertility in general, it's great to test for AMH and FSH and E2. The more data, the better. It's important to keep in mind that in addition to ovarian reserve, hormones bring other things to the fertility table, too. AMH, for example, is a marker of when you're likely to experience menopause, how your body will respond to procedures like IVF and egg freezing, and miscarriage.

Many hormone testing kits on the market today only test for FSH, without AMH or E2. EDU Fertility always tests for AMH, and in some cases all three of these hormones, depending on the type of birth control you're using.

Let's dive into the nitty gritty of these three hormones.

AMH: The Real Deal

"AMH levels appear to be an early, reliable, and direct indicator of ovarian function," says Dr. Jeffrey Steinberg of Ferny Fertility Clinic of New York City. AMH is a hormone produced by the cells in your ovarian follicles. The amount of AMH in your blood helps estimate the number of follicles in your ovaries, and therefore the size of your remaining egg supply. Your AMH levels decline as you age. By the time menopause hits, your AMH is virtually undetectable (meaning, your egg count ticks down to zero). AMH levels can be evaluated by a blood test on any day of your cycle – unlike FSH – no matter what type of birth control you're using. Think of it this way: AMH can be tested more accurately at any time since the number of follicles remains consistent throughout your menstrual cycle.

Next up: FSH

FSH is the hormone required to produce and mature eggs in the ovaries. Without FSH, eggs couldn't fully develop. Ovulation, fertilization, and pregnancy require a grown-up egg. "FSH levels vary depending on where you are in your menstrual cycle," says Kara Manglani, a nurse-midwife and fertility expert. During your period, your levels of estrogen and progesterone are low. Around the time your period ends, the low level of estrogen signals your brain, which then signals your pituitary gland to secrete FSH. FSH stands for follicle-stimulating hormone and it does exactly that, prompting your follicles to grow and maturation. As your follicles continue to grow, they start to produce estrogen, until eventually one follicle ovulates and FSH levels drop.

In order to get an accurate measure of your FSH levels, a blood test is done on the third day of your period. This is commonly known as "Day 3 Testing." You might think you want your FSH levels to be high, but that's actually not the case. (A bit counterintuitive, we know – stick with us.) Ideally, FSH will be low around day three of your cycle. This indicates your ovaries don't have to work super hard to produce and mature an egg. As you get older, your ovaries will have to work harder to generate that egg, so your FSH levels will be higher as a result – think of it as stepping on the gas.

But what does FSH have to do with ovarian reserve? "Women with normal or high ovarian reserve have a sufficient production of estrogen and progesterone from small follicles early in the menstrual cycle, which maintains FSH at a low level," says Steinberg. Like we mentioned, as you age, the number of follicles and eggs you have decreases. In turn, this means your body has to work harder to find and mature a follicle. Your FSH levels go up, since your body requires extra fuel to locate and grow a follicle. Here's a good food metaphor: Ever have a totally empty, sad refrigerator or pantry? When you're starving, you have to put in extra energy to order take out, go to the grocery, or go out to eat to appease your hunger. But when your fridge is full – well, then it's easy. It requires way less energy to feel satiated.

Where does E2 come into play?

It's important to test not just FSH, but also but E2 along with it. E2 maintains the reproductive system, kind of like the conductor of the ovary orchestra. (Remember how its rise and fall is responsible for cueing FSH production?) E2 is present in varying levels during your menstrual cycle to do things like prompt the maturation of follicles, release of an egg, and thickening of the uterine lining so a fertilized egg has a safe, soft place to make a home. Your E2 levels are highest at ovulation and lowest when your period first begins. E2 needs to be tested on day three, too. Ideally, your levels should be low at this point. If they're high, they could be suppressing FSH production. (Remember, a rise in estrogen signals your body to produce less FSH.)

This is why your E2 levels are key to understanding the accuracy of your FSH report and assessing ovarian reserve through FSH. Say, for example, someone only tests for FSH and the results come back low. They may not think anything of it – after all, this suggests a normal or high ovarian reserve. But what if their E2 levels are high? This could mean FSH is low because it's being suppressed, not because it's naturally low. Essentially, the interpretation of ovarian reserve using FSH can get muddied or be misconstrued without E2.

The Perfect Fertility Testing Combination

Let's do a quick review: Fertility hormone testing can help you discover your ovarian reserve, where you're at in terms of egg count. Three key hormones can point to ovarian reserve: FSH plus E2, and AMH. AMH is the best fertility hormone test to give you knowledge and power regarding ovarian reserve. But because these hormones have different responsibilities, point to different reproductive features and functions, and can influence each other, it's not a bad idea to test for all three. (If you're on hormonal birth control, you can still do AMH – and thyroid-stimulating hormone, or TSH – testing.)

You may be wondering, why don't all fertility tests include AMH? Great question. According to Steinberg, it's because there's no international standard for AMH yet. In other words, there aren't agreed upon guidelines to take into consideration when comparing AMH test results between laboratories. There's no question as to AMH's usefulness, but with the establishment of a standard, doctors can get even better at applying AMH in a clinical setting.

How to Get the Info You Need

It's important to keep in mind that ovarian reserve and the hormones that influence it are very important pieces of the fertility puzzle, but they aren't the whole puzzle. For example, to get an even more accurate picture, you should also have your LH (luteinizing hormone) levels tested. While LH doesn't relate to ovarian reserve, it's also what triggers ovulation, causing the follicle to release the egg into the fallopian tube. Once you are pregnant, LH also prompts the production of progesterone, which maintains the fetus early on. EDU Fertility also tests for LH. A transvaginal ultrasound can also help to evaluate your fallopian tubes (if they're blocked, for example), uterus, vagina, and cervix, as well as the thickness of your uterine lining.

Understanding your ovarian reserve through hormone testing is a great first step. However, it's important to make sure you're taking this first step in the most accurate, effective way possible, by first looking to AMH.

Chapter 2
Pre-implantation

EDU

Endometrial Preparation: Medication Before Embryo Transfer

The goal of the medication taken in a donor-assisted IVF cycle or embryo transfer is to make your uterine lining ready for the embryo transfer in the best way and in the time frame chosen by you. Normally, it takes 10 to 21 days (average 14 days) to achieve the desired endometrial thickness.

To prepare the recipients for embryo transfer, the following medication groups are used:

Estrogen and Progesterone (natural or synthetic)

Step 1 of your hormonal treatment usually consists of one cycle of estradiol and progesterone intake before the actual embryo transfer cycle – this is taken to replicate the stages of the normal menstrual cycle. That is why it is not a concern whether you do or do not have your own menstruation.

Estrogen and progesterone help to time menstruation logically for the chosen timing of the embryo transfer.

They also help to facilitate your uterus' own skill of building endometrium up and down.

Examples of natural estrogen tablets include Progynova, Progynon, Estradiol, Estrofem, and Femanest.

Examples of synthetic estrogen+progesterone tablets include Neovletta, Femoden, and Marvelon.

Down-Regulation

Now we move into Step 2. You will have one injection of a "down-regulating" hormone. The aim of this is to avoid premature ovulation (as premature ovulation may move your "implantation window" and considerably decrease the implantation success rate).

Down-regulation switches off your own ovarian activity for just one cycle.

It also helps to avoid premature ovulation and progesterone production because this would shift your implantation window forward and would result in a decrease in success rates.

Examples of this type of medication include Procrene Depot (3.75mg – 1 single injection), alternatively Diphereline Depot, Buserelin Depot, Zoladex, Decapeptyl Depot, or other agonist GnRH.

From time to time patients ask not to include the down-regulation injection ("artificial menopause") in their treatment plans for egg donation, or embryo adoption, explaining this request by their very unpleasant experience with this medication in their previous own-egg IVF treatments. They note its unfavorable impact on their general state, mood, and concentration; some of them even say that they had to stay off work and interrupt their usual daily life for around a month.

However, the way the "artificial menopause" feels in an embryo, or egg donation cycle, is much milder than the perception of "artificial menopause" in long protocols of own-egg IVF treatment.

First, before the start of artificial menopause in our treatment plans, the patients take estrogen and progesterone that counter-balance the effect of the down-regulation injection.

Secondly, IVF own-egg stimulation protocols usually extend the artificial menopause up to three weeks. In the case of egg/embryo donation treatment, this period is much shorter and does not exceed seven days, so the undesired symptoms are highly unlikely to appear in such a short period.

It's also good to understand that the refusal of down-regulation may lead to the shift of the implantation window and to the increase of progesterone. This in turn can lead to the reduction in implantation rates so that the embryo transfer on the planned date is not advisable.

Taking all the above factors into consideration, most patients reconcile with the idea of a short artificial menopause, and as a result, they keep their peace of mind and continue smoothly, without issues, through their treatment schedule.

Estrogens

Step 3 starts when you stop estradiol and progesterone in your previous cycle ("training cycle") and menstruation begins. We then ask you to have your first ultrasound scan at your local doctor to check the thickness of your endometrium and to make sure that there are no cysts found.

Your preparation continues with estrogen tablets, cream, and/or patches which help your lining to gain the optimal thickness needed for the embryo transfer. You will monitor the growth of your lining again with a second ultrasound at your local doctor to see how thick it is and whether additional estrogen doses may be required.

Both oral and transdermal forms are used to maintain a stable hormonal level during and after the donation cycle.

Estrogens grow the endometrium lining in the uterus to prepare it for the embryo transfer.

Estrogens also sustain the endometrium lining after the embryo transfer so that your menstruation doesn't begin before the embryonic placenta picks up the function of hormonal support in your pregnancy.

Examples of estrogen tablets include Progynova, Progynon, and Estrodiol.

Examples of estrogen patches include Climara, Estradot, Evorel, and Vivelle.

Sometimes patients ask about the amount of estrogen required before the embryo transfer and also two months after it. They inquire whether it is possibly too high. The doses that we prescribe are still much lower than the estrogen created by your placenta in the second and third trimesters. That means that this external estrogen is not comparable in its level with the regular hormonal balance in a woman's body during pregnancy.

Progesterone

We now move into Step 4. Six days before the planned date of your embryo transfer you will start with progesterone. This time you will need to take two forms of progesterone at once: vaginal pessaries, or cream and injections. It has been scientifically proven that such a combination is the best way to prevent an early miscarriage in pregnancies after egg donation or embryo adoption.

Progesterone prepares the uterine lining for the reception of the embryo.

It also sustains the endometrium lining after the embryo transfer so that your menstruation doesn't begin before the embryonic placenta picks up the function of hormonal support.

Examples of progesterone medication include Crinone vaginal gel and Utrogest vaginal pessaries.

Other Medication

Vitamins and other medications may be used to improve the blood flow in the uterus before, during, and after the embryo transfer. Other medications may be used to reduce the immunity of the potential mother to the embryo. After having thoroughly studied your medical history, we add the necessary medication to your egg/embryo donation treatment plan on an individual basis.

Boost Male Fertility and Increase Sperm Count

Infertility is a growing problem worldwide.

It affects about one in every six couples, and researchers estimate about one in every three cases is due to fertility problems in the male partner alone. While infertility is not always treatable, it can sometimes be improved with a healthy diet, supplements, and other lifestyle strategies. The list below includes some of the main lifestyle factors, foods, nutrients, and supplements that have been associated with improved fertility in men.

Numerous strategies may help improve your fertility, although this depends on its cause. Also, keep in mind that fertility and libido usually go hand in hand with your general health. For this reason, anything that improves your overall health is likely to boost your fertility at the same time.

Here are eight tips to boost fertility and sperm count/quality:

1. **Lead a healthy lifestyle:** Unhealthy lifestyle practices impair your overall health, including fertility.
2. **Lose excess weight:** Obesity is associated with infertility. If you are infertile and obese, weight loss should be one of your top goals.
3. **Limit your alcohol intake:** Avoid heavy alcohol consumption, as it may reduce testosterone levels and impair semen quality.
4. **Get enough folate:** A few studies indicate that a low intake of folate may impair semen quality.
5. **Get adequate sleep:** Getting adequate sleep is vital to maintaining your health. Restricted or excessive sleep has also been linked to poor semen quality.
6. **Snack on walnuts and almonds:** Eating a lot of antioxidant-rich foods, such as walnuts, seems to benefit fertility. Almonds contain natural omega 6.
7. **Consider supplements:** Antioxidant supplements also seem to work. Some evidence suggests that coenzyme Q10 improves semen quality. Omega 3 is excellent.
8. **Avoid eating too much soy:** Soy is rich in isoflavones, which are associated with lower semen quality.

The following is a list of nutrients and foods that promote sperm health:

Zinc	Omega 3
Folate	Omega 6
Vitamin B-12	L-arginine
Vitamin C	Maca
Vitamin D	Ginseng
Vitamin E	Fenugreek Seeds
Coenzyme Q10	Ashwagandha Root
D-aspartic acid	Maco Root

Focus first on improving your general health. Many of the tips mentioned are key components of a healthy lifestyle. While none of them are guaranteed to work, if you suffer from nutrient deficiencies or low testosterone levels, chances are that they may help.

Preliminary Tests

The following is a list of preliminary tests to be possibly taken prior to fertility treatments:

- HIV
- Syphilis
- Hepatitis B
- HCV Hepatitis C
- IgM Toxoplasma
- M Ig Cytomegalovirus
- IgM Rubella
- PCR, Virus Chlamydia
- Endocervix Culture
- Cytology / Pap smear
- Blood type
- Rh
- CBC
- LFT
- Glucose
- Urine test

Preparing for a Semen Analysis

Make sure that you get the best possible results (and avoid unnecessary worry) by following a few tips on how to prepare for a semen analysis.

Semen analysis is the first step towards understanding a man's fertility. The test will measure key parameters of semen known to impact fertility. Minimally, it will measure sperm count or concentration (how many sperm you have), sperm motility (how many of them swim), and semen volume (how much semen you make). A more comprehensive analysis will also measure sperm morphology (the shape of sperm), liquefaction time (semen starts out viscous and over time should become watery), and the pH of the semen (how acidic it is).

Typically, semen analysis is performed by a technician who will literally take a drop of the sample, place it on a microscope slide, and analyze it under a microscope. A number of factors including technician experience, method used, and equipment can impact the quality of the results.

Because sperm are relatively fragile, sample collection and handling will also impact the quality of test results. If the sample sits in the cup too long, sperm will begin to die and break apart. If part of the sample isn't collected, volume and count measurements will be inaccurate.

The Week Before the Test

A bit of abstinence helps. To optimize results, it is best to test four days following your last ejaculation. The testicle is constantly producing sperm, which are stored in a long tubular structure called the epididymis. During an ejaculation, the epididymis is emptied and fresh sperm flow into it. It takes two to three days to completely refill the epididymis. Testing too soon after an ejaculation will usually show a lower sperm count.

So, waiting longer is better, right? Not exactly. Sperm cells have a limited lifespan of three weeks max inside the testicle. When ejaculations are infrequent, sperm cells start to die and break down inside the body.

To get a good understanding of how healthy your sperm are, you really want to look at a fresh batch. In the week or two prior to a semen analysis, it is a good idea to "clean out the pipes" with more frequent ejaculations to clear out dead cells and fragments. Then, wait a few days to allow the epididymis to fill up with fresh sperm.

Avoid heat. This includes hot tubs, saunas, grilling, laptop heat and the like. Brief exposures to high heat in the days prior to a semen analysis can cause premature cell death and will impact your motility results.

Prolonged heat exposures like fevers, frequent hot tub use, long periods of sitting, occupational heat exposures, or laptop use can impair sperm production. Unfortunately, this cannot be resolved quickly. It takes about two and half months to make a sperm start to finish. However, if you have had prolonged exposures to high heat or a fever over 100 degrees Fahrenheit in the past three months, it is worth mentioning to the doctor.

Avoid caffeine, smoking (especially marijuana), alcoholic beverages, and bicycle riding for up to two weeks prior to the semen collection. All of these activities will impair semen quality.

Collecting a Sample

While you probably learned the ABCs of how to produce a semen sample sometime in middle school, there are a few things worth noting when you are trying to get some feedback regarding your fertility.

Collecting a Sample at Home

Semen starts out viscous and over time liquefies. This helps it to stay near the cervix, then as it liquefies, sperm are free to swim to the intended destinations. Clinics want to measure how long it takes the semen to liquefy, which is typically under an hour. For this reason, it is most preferred to collect the sample at the clinic. However, if you live close enough, you may be able to bring a sample from home. Ask the doctor if you would prefer this option. If you have been given the green light to collect your sample at home, there are a few things you need to do to make sure you get accurate results.

Cap it right away: Semen samples tend to look like a few drops of liquid in the bottom of a big cup. Because the whole sample is spread out, seminal fluid is more likely to evaporate, which in turn can cause sperm to dry out and die. Placing the cap on immediately after collection will reduce evaporation and improve accuracy of semen volume and sperm motility measurements.

Record exact time of collection: This will help the clinic to evaluate liquefaction time and ensure that the semen is analyzed at an appropriate time

Watch the temperature: Sperm can only live for a few hours outside the body. Wild swings in temperature will cause sperm to die more quickly. Ideally, the cup should stay slightly below body temperature.

Get to lab quickly: It is important to get the sample to the lab as quickly as possible to ensure a timely analysis. If the elapsed time from collection to analysis is much longer than an hour, motility scores drop dramatically.

Is it Okay to Get a Little "Help"?

Collecting a semen sample for analysis can be uncomfortable ethically and emotionally. Most cultures and religions have specific rules or customs surrounding sex, masturbation, and procreation. Finding a way to honor your traditions while getting important information about your health and fertility can be daunting. Most labs are aware of these issues and support patients by altering requirements and procedures to respect cultural and religious traditions. If you have strong concerns or reservations, you may want to seek out a religious leader or a fertility expert who shares your traditions and can help guide you through the process.

Even if cultural or religious ideals do not pose a conflict for collecting a sample, some men find it emotionally or biologically difficult to produce a sample on their own. Interestingly, studies have found that more sperm is present in the semen collected during intercourse. The body somehow knows it's the real deal. This presents the argument for having your partner help you. Like collection at home, collecting with a partner complicates sample handling and requires a bit of extra preparation.

Use a collection condom: The highest concentration of sperm resides in the first few drops of ejaculate. For this reason, most clinics prefer that you obtain the sample without the help of your partner. If you are collecting with a partner, you will need to purchase a special collection condom. Regular condoms are designed to kill sperm. Do not use them when collecting a test sample. Collection condoms are designed to keep sperm healthy and available for analysis.

Pass on the lube: Like condoms, lubricants are designed to kill sperm cells. It may interfere with other factors the doctor is testing for, so ask first.

Understanding Your Sperm Analysis

Sperm Counts

Laboratories performing sperm "counts," in general, vary in the details that they provide the physician requesting the "count." A general sperm count as part of a fertility evaluation should include the total density or count (20 million per ml or above) and the motile density (8 million per ml or higher). The motile density is perhaps the most important part of the semen analysis, as it reports the total number of sperm thought capable of progressing from the site of sperm deposition to the site of fertilization. This value is essential in both allowing a determination regarding whether or not a semen analysis is "normal," as well as in providing prognostic information should advanced reproductive medical assistance be required. (Numbers in italics are what "normal" values should be.)

Definitions of "abnormal" counts:

- **Polyzoospermia:** Excessively high sperm concentration
- **Oligozoospermia:** Sperm count less than 20 million/ml
- **Hypospermia:** Semen volume < 1.5 ml
- **Hyperspermia:** Semen volume > 5.5 ml
- **Aspermia:** No semen volume
- **Pyospermia:** Leukocytes (germ fighter cells) present in semen
- **Hematospermia:** Red blood cells present in semen
- **Asthenozoospermia:** Sperm motility < 40%
- **Teratozoospermia:** > 40% of sperm seen are of abnormal form
- **Necrozoospermia:** Non-viable ("dead") sperm
- **Oligoasthenozoospermia:** Motile density < 8 million sperm/ml

Sperm Morphology (Shape and Appearance)

The evaluation of sperm size, shape, and appearance characteristics should be assessed by carefully observing a stained sperm sample under the microscope. The addition of colored dyes (stains) to the sperm allows the observer to distinguish important normal landmarks (characteristics) as well as abnormal findings. Several methods of staining sperm are used, and the method employed should be one with which the examiner is comfortable and experienced.

Several different shapes or forms of human sperm have been identified and characterized. These forms fall into one of four main categories: normal forms, abnormal head, abnormal tail, and immature germ cells (IGC), as described as follows:

Normal Forms

Normal sperm have oval head shapes, an intact central or "mid" section, and an uncoiled, single tail.

Abnormal Heads

Many different sperm head abnormalities may be seen. Large heads (macrocephalic), small heads (microcephalic), and an absence of identifiable head are all seen in evaluations. Tapering sperm heads, pyriform heads (teardrop shape) and duplicate or double heads have also been seen. Overall (gross) abnormalities in appearance may be termed "amorphous" changes.

Abnormal Tails

Coiling and bending of the tail are sometimes seen. Broken tails of less than half the normal length should be categorized abnormal. Double, triple, and quadruple tails are sometimes seen and are considered abnormal. Cytoplasmic droplets along the tail may indicate an immature sperm.

Immature Germ Cells (IGCs)

White blood cells (WBCs, germ fighters) in the semen should rarely be seen. It is very difficult to distinguish between an immature germ cell and a WBC. Because the presence of WBCs in the semen (pyospermia) can be a serious concern, if a report of "many IGCs" is delivered, it becomes very important to assure that these cells are not, instead, WBCs.

Sperm Motility (Movement)

Sperm motility studies identify the number of motile (moving) sperm seen in an ejaculate specimen. Here again, as in many other sperm studies, many laboratories use "normal" values that are out of date and inaccurate. Many labs will assess sperm motility upon receipt of the specimen, and again at hourly time intervals for four to twenty-four hours. It is well known that sperm motility is a temperature dependent sperm function, so the handling and processing of specimens is critical. It is for this reason that we, except in very rare instances, require that specimens be evaluated only in a laboratory such as our own, where we are able to tightly control laboratory conditions. We have found the repeated testing of sperm over time for motility adds little to the evaluation of motility over the initial sperm motility assessment. Sperm are known not to survive well for extended periods of time in semen, and in nature, sperm very rapidly leave the semen to enter the cervical mucus. Many laboratories consider "normal" sperm motility to be 40 percent or greater.

The following is a discussion of common sperm motility characteristics.

Asthenozoospermia

Decreased sperm motility. If found to be present, exam should be repeated to assure that laboratory conditions did not cause the problem. Frequent causes include abnormal spermatogenesis (sperm manufacture), epididymal sperm maturation problems, transport abnormalities, and varicocele. These conditions should all be looked for if sperm motility is repeatedly "low."

Necrozoospermia

A total absence of moving sperm. It is vital, if sperm are seen but are not moving, to carry out studies (vital stains) to see if the sperm seen are alive. It is possible to have sperm with normal reproductive genetics that are deficient in one or several of the factors necessary to produce motility. We have achieved several successful pregnancies employing microinjection of healthy, non-motile sperm directly into the egg (ICSI).

Chemical and Biochemical Semen Characteristics

Semen Acid-Base Balance (pH)

The pH of semen is measured using a specially treated paper blot that changes color according to the pH of the specimen that it is exposed to. The pH of normal semen is slightly alkaline ranging from 7.2 to 7.8. Prostatic secretions are acidic while the secretions of the seminal vesicles are alkaline. Therefore, alterations in pH may reflect a dysfunction of one or both of these accessory glands. The pH of semen has not been generally found to have a major influence on a man's fertility potential.

Color and Turbidity

Semen is normally translucent or whitish-gray opalescent in color. Blood found in semen (hematospermia) can color the semen pink to bright red to brownish red. The presence of blood in semen is abnormal and should be reported. The presence of particles, non-liquified streaks of mucus, or debris requires further evaluation.

Liquefaction

Semen is normally produced as a coagulum. The specimen will usually liquefy within 30 minutes. The failure to liquefy within one hour is abnormal. Excellent methods for correcting this problem in the laboratory are available.

Viscosity

Non-liquefaction and excessive viscosity are two separate conditions. Viscosity is measured after complete liquefaction has occurred. Viscosity is considered "normal" if the liquefied specimen can be poured from a graduated beaker drop by drop with no attaching agglutinin between drops. The role of hyper (excessive) viscosity is being studied, but it seems possible that this condition may interfere with the ability of sperm to travel from the site of deposition into the cervix or uterus.

Want a Baby Someday? How to Preserve Your Fertility

If you're thinking about getting pregnant now or later in life, you need to take certain steps right now to help keep your body in peak baby-making shape.

Considering you probably spend a good amount of energy trying to block conception, it's kind of odd to think about preparing yourself for a day when you might want to raise the gate to your reproductive system and have a baby. Maybe you're not at that point now – you're happily putting in long hours at a job you love, you're still enjoying being able to jump in the car for a road trip on a moment's notice, or you just haven't yet found a guy who's worthy of mixing his DNA with yours. But you'd still like to think that if the baby urge hits you like a ton of bricks, pregnancy over 40 won't be a problem.

Yet, everywhere you look, an article or book (or even your own mom!) is there to remind you that your fertility drops every year you wait. You probably know the scary stats: women reach their reproductive peak in their twenties, and by age 35, the risk of infertility jumps to 22 percent. But before you start googling "egg freezing" (by the way, that's still experimental, and only a tiny number of babies have been born from frozen eggs), keep in mind that every woman's biological clock is different. Some women can get pregnant easily at 40, while others run into problems as early as their twenties. And while you can't stop the clock on the most important fertility factor – your age – there are plenty of lifestyle changes you can make now to up your odds of getting pregnant later.

If you want to get pregnant in five years...

See your doctor. If you want to keep your body baby-ready, staying in top physical shape is essential. That means getting any fertility-sapping health issues – like diabetes, polycystic ovary syndrome (PCOS), or endometriosis – under control; diagnosing and treating STDs; and devising a healthy diet and exercise plan. If you're past 35 and wondering whether you have the option of waiting a few more years, you can also ask your doc to do a little detective work on what's known as your ovarian reserve.

"All women are born with a certain number of eggs, and you lose them over your reproductive life span," explains Michael Soules, M.D., medical director of Seattle Reproductive Medicine. "At some point – about 10 years before the onset of menopause – the number drops to a level where your fertility is compromised." But there are fertility tests that can gauge how many eggs are still sitting on the bench waiting for their turn at bat. The best ones are an ultrasound to count the number of follicles in your ovaries and a blood test to check your hormone levels at certain points in your cycle. These tests, which Soules says are usually covered by insurance (check with your plan to make sure) can't guarantee that you're fertile (too many other factors come into play). But they can tell you how loudly your clock is ticking and whether you need to consider speeding up your schedule.

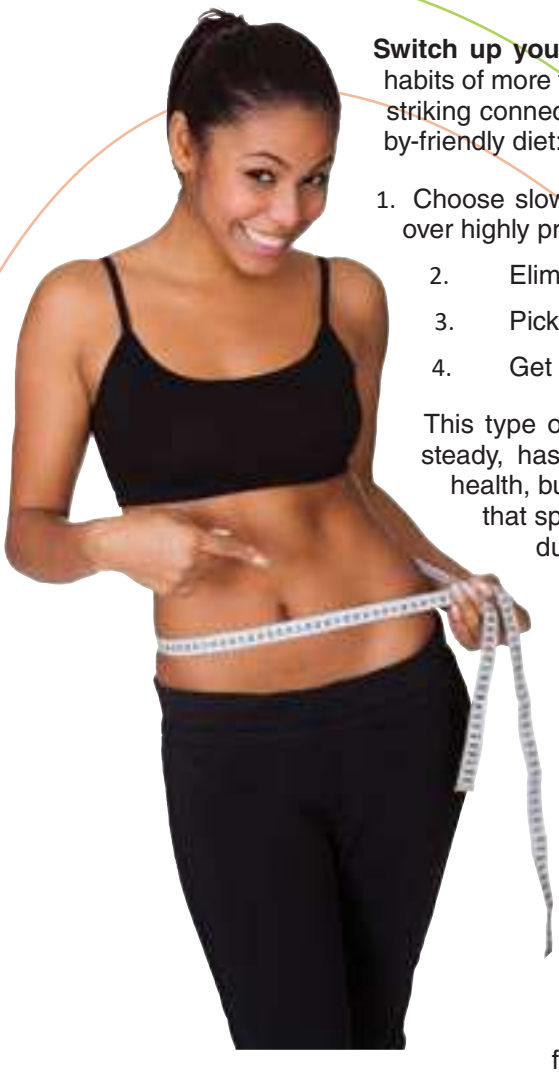
Brush and floss. Could something as simple as flossing your teeth help keep you fertile? Perhaps. "Several studies have indicated that a woman's oral health may be related to her reproductive success," says Susan Karabin, D.D.S., a spokesperson for the American Academy of Periodontology. In one study, women who needed fertility treatments had higher levels of gum bleeding and

inflammation than those who conceived naturally, the *Journal of Periodontology* reports. "Brush and floss every day and get a professional cleaning and exam every six months," advises Karabin, who adds that not smoking and avoiding sugary foods and drinks are also key to keeping your teeth and gums healthy.

Practice safe sex. You wouldn't think condoms would come up in a conversation about getting pregnant, but safe sex can be a crucial factor in your future ability to get knocked up. If you contract an STD such as gonorrhea or chlamydia (which could be in your system without causing symptoms) and it goes untreated, it can lead to a serious condition called pelvic inflammatory disease, which can scar the fallopian tubes, causing infertility. So get tested regularly – and make sure your partners do too.

Stamp out cigarettes. If higher rates of lung cancer and breast cancer haven't made you swear off smoking, consider this: The American Society for Reproductive Medicine (ASRM) estimates that lighting up is linked to 13 percent of infertility cases. Tobacco messes with your fertility in all kinds of ways: it makes your eggs deteriorate faster than they naturally would with age, increases your risk of early miscarriage and ectopic pregnancy (a dangerous condition in which the egg implants in your fallopian tubes or ovaries instead of your uterus), and can bring on early menopause (up to four years earlier, compared with non-smokers). Plus, if you wind up needing in vitro fertilization (IVF), smoking will reduce your chances of success by 34 percent. The encouraging news, though, is that once you do quit smoking, your fertility level will return to normal in about a year (considering that it takes the average puffer two to four tries before quitting for good, you should start trying to kick the habit well before that). While you're at it, recruit your partner, parents, and friends to quit with you. A recent study in *Tobacco Control* found that women who were exposed to secondhand smoke six or more hours a day as adults were 36 percent more likely to have trouble getting pregnant.

Take your vitamins. "Every woman of reproductive age – even if you're not actively trying to get pregnant – should take a multivitamin containing folic acid," says Jorge Chavarro, M.D., an instructor at Harvard Medical School and co-author of *The Fertility Diet*. According to Chavarro, folic acid appears to improve fertility by stimulating ovulation and giving an embryo essential proteins needed for survival. His research also found that women who took iron supplements were 40 percent less likely to have fertility problems, so look for a vitamin with at least 40 milligrams of iron and 400 micrograms of folic acid, and get in the habit of downing the pill every morning.



Switch up your grocery list. In Chavarro's groundbreaking study of the dietary habits of more than 18,000 nurses who were trying to get pregnant, he found some striking connections between food and fertility. There are four basic rules of a baby-friendly diet:

1. Choose slowly digested carbohydrates (such as vegetables and whole grains) over highly processed ones (such as white bread and white rice).
2. Eliminate trans fats (aka partially hydrogenated oils).
3. Pick unsaturated fats over saturated fats.
4. Get the majority of your protein from plants rather than animals.

This type of low-glycemic diet, which keeps your blood sugar level nice and steady, has long been known to fight diabetes and improve cardiovascular health, but it also can have a profound effect on fertility. "When you eat foods that spike your blood sugar, such as simple carbohydrates, your body produces more insulin, and that in turn leads to a higher amount of testosterone circulating throughout your body," Chavarro says. "Over time that can interfere with ovulation." He explains that different types of fats and proteins also affect blood levels of glucose and insulin. So get into the habit of eating lots of fruits and veggies, and trade red meat for fish, nuts, eggs, and beans whenever you can.

Maintain a healthy weight. When it comes to your weight, the "fertility zone" is a body mass index between 20 and 24.

In fact, the ASRM (American Society for Reproductive Medicine) estimates that 12 percent of infertility cases are due to weight problems, divided equally between the underweight and overweight. Weigh too much and you have a greater likelihood of irregular periods and ovulation disorders (though even a moderate loss of 5 to 10 percent of your body weight can help kick-start your ovulation); weigh too little and you may not ovulate at all, since body fat triggers the hormones that tell your ovaries to release an egg.

Move your butt. "Our research found that 30 minutes of moderate to vigorous exercise each day on most days of the week is related to a lower risk of infertility," says Chavarro. If you need an extra push to get there, he suggests adding a mix of strength training, stretching, and aerobic exercise such as biking, hiking, or swimming. Too much exercise, though – anything that brings you to less than 17 percent body fat, or a BMI of 19 or lower – can interfere with ovulation. But unless you're doing an Olympic-level training program, you probably need more exercise, not less.

Upgrade your water bottle. While you're working up a sweat, you'll work up a thirst – but make sure you swig your water from a BPA-free bottle. Researchers at the University of California, San Francisco, recently looked at the BPA (bisphenol-A) levels in women undergoing IVF and found a correlation between the level of the chemical in the blood and the ability to conceive. The theory is that BPA, which mimics estrogen, can mess with the balance of hormones in your body. The chemical can be found in the linings of canned goods and sports water bottles, but many companies are now marketing bottles made from safer materials such as stainless steel.

Save your calories for ice cream. Our favorite bit of health news ever. If you add one serving of full-fat dairy to your diet per day, such as whole milk on your cereal instead of skim, you can actually increase your chances of getting pregnant, according to Chavarro's research. There is one caveat, however: "You have to make adjustments to the rest of your diet so you don't gain weight," Chavarro says. He also stresses that this should not be a lifetime change – once there's a bun in your oven, you can go back to drinking skim and eating low-fat fro-yo.

Rethink your birth control. Now that you're getting closer to wanting a little munchkin, it's time to think about what's kept you from having one in the past. Barrier methods (such as condoms or a diaphragm) are easy: simply stop using them the day you're ready to get pregnant. If you have an IUD, your fertility will return as soon as your doctor takes it out. The same goes for pill users.

Whether you've been taking it for one year or 20, don't believe the rumor that it'll be months before your ovulation revs back up, says Vanessa Cullins, M.D., vice president for medical affairs at Planned Parenthood of America. "Women may have a few irregular cycles at first, but ovulation can happen within two weeks after you toss your last pack," she says. But, Cullins points out, there is one form of birth control that takes time to exit your system before you can get pregnant. If you've had Depo-Provera injections, it can take up to 10 months to become fertile again.

Cut down on the booze and caffeine. Some studies show that having one to five alcoholic drinks per week can drop your chances of conceiving that month by as much as 50 percent. While other studies have found little connection between moderate drinking and fertility, Chavarro points out that sobriety certainly couldn't hurt, and it might help. And while you're at it, cut back on the triple-shot lattes. While there is no real consensus, some studies suggest that consuming more than 300 milligrams of caffeine a day (about two eight-ounce cups of regular coffee) may increase your risk of endometriosis or fallopian tube problems.

Reduce stress. "There's nothing a couple that is trying to get pregnant wants to hear less than 'Relax, you're trying too hard,'" says Janis Fox, M.D., a fertility specialist at Brigham and Women's Hospital in Boston. But stress can put a damper on fertility by messing with the brain signals that tell your body to ovulate. A study in *Human Reproduction* showed that couples were more likely to conceive during months they considered themselves relaxed. An effective way to start reducing stress now is to focus on what you appreciate in your life today, says Leslee Kagan, director of women's health at the Benson-Henry Institute for Mind Body Medicine in Boston. Every day, write down three things that you love about your life (no diapers to change, or the chance to spend endless, uninterrupted hours reading a great novel!), and take at least 15 minutes to meditate, do yoga, or listen to relaxing music. Believe us, a few years from now, when that baby you waited for is finally here, and you're groggily but happily dealing with colic and diaper rash, these relaxation skills will come in handy!

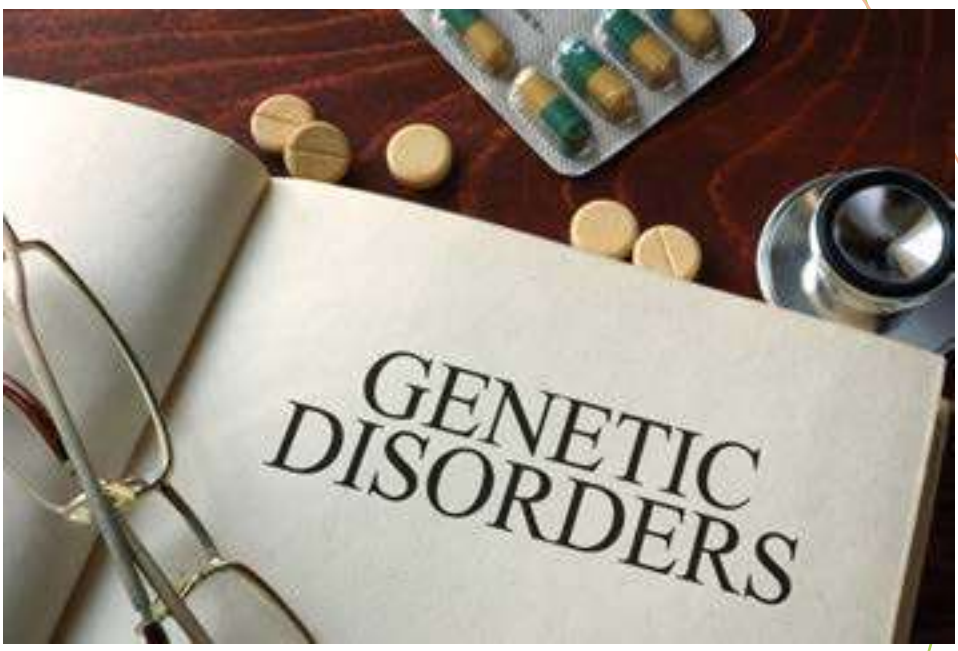
Preconception Carrier Screening

EDU Fertility takes a proactive approach with preconception carrier screening. We believe knowledge is power, so we recommend preconception carrier screening to every couple who wants to start a family. This type of genetic screening can help hopeful parents determine if either partner carries a genetic disorder that could be passed to the couple's children.

If one or more parent is a carrier of an inheritable genetic disorder, our fertility doctors offer treatments that can help them avoid passing the disorder to their children.

Preconception Carrier Screening Can Determine if Either Parent Carries a Genetic Disorder

All our couples and single women hope to have a healthy baby. It can be shocking when a baby with a genetic disorder is born to parents who appear to be healthy. In this situation, the parents are asymptomatic carriers.



Most genetic disorders are autosomal recessive, which means that if both parents are carriers, there is a 25 percent chance their child will have the disorder and a 50 percent chance their child will be a carrier.

Because asymptomatic carriers do not show symptoms, preconception carrier screening is necessary to determine whether either parent carries an inheritable disorder that could be passed to their future children. This holds true for donor assisted IVF as well. Without testing, parents may have no idea that they are at risk of passing a genetic disorder to their children.

A Look at the Process of Preconception Carrier Screening

A clinical geneticists will recommend that all hopeful parents receive preconception carrier screening before trying to conceive. Each patient only needs to provide a blood sample, which will be screened for all indicated autosomal recessive disorders.

If testing indicates that hopeful parents carry an abnormal gene, they can still have a healthy baby with help from in vitro fertilization (IVF) and preimplantation genetic diagnosis (PGD). If you are using a donor, the donor must be checked for the same type of mutation.

Between the steps of fertilization in the IVF lab and embryo transfer, our reference genetics lab combines a genetic probe with a few cells from the embryos. This allows the laboratory to determine which embryos are healthy, which are affected by the genetic disorder, and which embryos are carriers.

Only unaffected healthy embryos are transferred to ensure that hopeful parents have the best chance of developing a successful pregnancy and delivering a healthy baby.

If you have any questions before consulting a clinical geneticist, you can contact us to learn more about preconception carrier screening.

Epigenetics: Using Donor Eggs

Epigenetics has been a fascinating and growing field of study over recent years, especially because of the implications it has for patients using donor eggs or donor embryos. In this section, we will give a quick explanation of what exactly epigenetics is and the incredible connections it establishes between a donor egg recipient mother and her unborn child.

Vocabulary

Epigenetics literally means "above" or "on top of" genetics. It refers to external modifications to DNA that turn genes "on" or "off." These modifications do not change the DNA sequence, but instead, they affect how cells "read" genes.

What is Epigenetics?

As explained by the National Center for Biotechnology Information, "epigenetics is defined as heritable changes in gene expression that do not involve a change in DNA sequence." Although the gene sequence itself cannot be altered, other environmental factors in the birth mother's body modifies the gene expression, or what the gene does. Essentially, scientific studies of epigenetics are revealing that the activity levels of some genes may be "dimmed" or turned up in response to other external cues from the environment – even in the womb! This means that as a donor egg recipient, your body still influences the gene development of your baby.

Epigenetics and Donor Eggs or Donor Embryos

One of the most emotionally challenging aspects of the IVF journey for many women is that their baby will not share genetic information with them. However, recent advancements in the field of epigenetics have suggested that the birth mother, including mothers who are recipients of donor oocytes, plays a significant role in the way the baby's genes develop.

Although certain characteristics of the baby may be genetically inherent of the egg donor, male partner, or sperm donor, the baby is still growing from the birth mother's body. After the implantation of the embryo and throughout the entire pregnancy, every cell in the baby's body is influenced by the birth mother's body. All the nutrients that the mother is intaking (protein, vitamins, minerals, calcium, sugars) are being used to build the little human inside of them. The baby lives in the birth mother's embryonic fluid for nine months, shares their blood flow, their rhythm, and the baby's gene expression is influenced by the prenatal environment of the mother's womb.

Donor Eggs: Will the Baby Look Like Me?

If you are wondering, "Will my baby look like me when using donor eggs?" the answer is the same for women who conceive naturally, and that is that nobody knows. Every egg and every sperm carries genetic material from the entire gene pool, including parents, grandparents, aunts, uncles, and so on. Even after the baby is born, the manifestation of genetics is a process that lasts throughout an entire lifetime.

Although a donor egg recipient mother does not contribute maternal genes to the baby, she still has a profound influence on how the baby's genes will perform throughout the individual's entire life.

Epigenetics: Your Lifestyle Impacts Your Baby's Gene Development

Intuitively, we can easily wrap our heads around the idea that many aspects of a child are influenced by the way they are raised. We realize that the child develops traits and behaviors from the parents who are raising him or her. However, when we translate this concept to a fetus inside the womb, it becomes a bit more nuanced. Does the environment make that much of a difference? Aren't the babies simply a genetic result of the biological parents?

Well, there are scientific revelations that explain the epigenetic effect in molecules known as microRNAs that are secreted in the mother's womb. These microRNAs act as a communication system between the mother and the growing fetus and are responsible for fine tuning the activity levels of genes during development and throughout life. So, epigenetics uses actual biological and chemical signals to regulate how much functional activity a gene will be putting out.

As a recipient of donor oocytes, you are responsible for more than just the gestation and birth of the baby. You are responsible for creating a healthy environment for the embryo to develop in, an environment that will literally contribute to the way in which the baby's genes form, which characteristics are turned on or turned off, and the future health of your child – even as an adult.

Epigenetics: Quality of Life Inside the Womb Has Life-Lasting Health Effects on the Baby

Not only does epigenetics *begin* in the womb, but scientists also believe that the most fundamental impact on gene function occurs in utero. A birth mother's womb serves as the first, and most impactful, environment for the baby. This means that the mother's lifestyle choices from even *before* conception, and especially throughout gestation, have a tremendous impact on the overall health of the individual for the rest of their lives.

Several studies, including the "fetal origin hypothesis" by David J. Barker, suggest that the environmental factors that an individual is exposed to *in utero* have a direct impact on whether that individual develops major medical conditions in their adult life. Essentially, the quality of life inside the womb plays a significant role in the future health of an individual.

Amazingly, the birth mother's health before and during conception also contributes to the overall health of the baby. So, it's best to get into a healthy lifestyle routine before conception and maintain healthy habits throughout pregnancy and beyond. Two main contributing factors to creating the healthiest prenatal environment possible for your baby are stress and nutrition. Talk to your physician to receive specific health recommendations.

Using Donor Eggs or Donor Embryos: You Contribute More Than You Think

Moral of the story: As a mother using donor eggs or donor embryos, you are completely involved in the development of your baby. Ultimately, it's the combination of genetics and epigenetics that form your baby into the unique human being that they become. If you are considering using donor eggs or donor embryos, we encourage you to register today to browse donor profiles and contact our friendly and knowledgeable team if you have any additional questions!

Preimplantation Genetic Screening (PGS) and Preimplantation Genetic Diagnosis (PGD)

PGS (pre-implantation genetic screening) can help couples not only select the gender of their child but can also determine if an embryo contains the normal number of chromosomes. PGD (pre-implantation genetic diagnosis) can identify particular genetic diseases that a person may carry while also assisting couples who could potentially transmit a sex-linked genetic disease to their children.

With 99.9 percent accuracy in predicting an embryo's gender, PGD/PGS gives couples the best odds in determining their baby's sex.

PGS allows couples to choose their baby's sex by identifying male and female embryos conceived in a laboratory, prior to transfer to the woman's uterus. PGS requires IVF, fertilization in a laboratory petri dish, along with a minor surgical procedure to remove eggs from the woman's ovaries. After fertilization, specialists examine the embryo for its sex chromosomes (XX for a female or XY for male), and then implant an embryo of the selected sex into the woman's uterus.

PGS was first developed in the 1980s. Interestingly, the initial application of PGD in humans was to determine the gender of embryos to prevent X-linked genetic diseases. This technique was first described in 1987 by scientists at the University of Edinburgh, and the first live births, healthy twin girls, were reported in 1990. Preimplantation genetic diagnosis has been used not only to detect gender but also to detect abnormalities of chromosomes, such as Down syndrome, but may also be used to "diagnose" serious single-gene disorders such as cystic fibrosis and sickle-cell anemia prior to implantation.

Embryo Quality

With all methods of PGS, an important fact is worth noting: A surprisingly high percentage (50-70 percent) of embryos will be found to be abnormal, even in healthy, fertile couples. A typical PGS case might look something like this: 12 eggs are retrieved, 11 are suitable for fertilization, 9 fertilize, 7 are biopsied, 3-6 are normal, and 2 or 3 of the normal embryos are of the desired gender. There is no real scientific way to determine how many embryos will survive, how many embryos will be male or female, or if they will produce a pregnancy. In few instances, it is not always possible to determine the gender during the first biopsy. These embryos may require a second biopsy.

This news can be a shock when couples get the results of their embryo biopsies. But this is all part of being human and it can help explain the many miscarriages that women experience as a whole. Not all of our eggs or embryos are healthy or free of chromosomal abnormalities, and most of them do not have the potential of turning into perfect little babies. But many embryos do. PGD/PGS can help physicians sort out the "good eggs from the bad," to borrow an expression. And it gives couples the opportunity to produce a healthy child of the gender they're hoping for.

The Scientific Understanding of Gender Selection

It has been known for many years that the gender of a pregnancy is determined by the sex chromosome carried by the sperm. Sperm bearing an X chromosome, when united with the X from the female (females only produce X) will result in an XX pregnancy that produces a female. If a sperm bearing a Y chromosome (men have both X and Y bearing sperm) unites with the X chromosome from the female, an XY pregnancy will result that gives rise to a male offspring.

Armed with this knowledge, science initially worked to allow for an accurate method of safely separating sperm to allow the majority of those sperm capable of producing the desired gender (X sperm or Y sperm) to be exposed to the female egg (oocyte). While a variety of methods of purifying the sperm separation process have been reported and studied, in reality, very few of these methods have withstood scientific scrutiny that "checks" the validity of claims made by those employing the procedure.

Because no sperm separation method thus far developed has produced the high level of sperm separation X (for female) and Y (for male) needed to provide gender outcome success levels greater than 90 percent, further work to perfect the gender selection process is being studied.

Sperm that have been filtered by our standard sperm preparation process are allowed to fertilize the eggs obtained from the female "in vitro" (in our highly specialized fertility laboratory). The embryos resulting from this specialized fertilization process are then screened by our genetics team to determine both their gender and that selected chromosome pairs have resulted in an expected normal genetic pairing outcome (this process is called "aneuploidy" screening). This gender determination process at the very early development level as made famous by our center has resulted in the ability to provide gender selection results for the chosen gender far in excess of 99.9 percent.

The aneuploidy (abnormal chromosome count) screening process also employed at the time of PGD gender determination also allows for the detection of limited genetic count abnormalities as a routine or for the optional screening of the embryos for a wide variety of additional genetic abnormalities. Upon request, we can screen for genetic abnormalities such as Down syndrome (one extra chromosome 21), Turner's syndrome (the absence of one of the two X chromosomes normally found in a female), and Kleinfelter's syndrome (a male with one Y chromosome and two X chromosomes instead of the normally found single X chromosome).

New DNA microarray technology also provides us the option of screening embryos for a full (46 chromosome) genetic count. We are also able to provide those patients known to carry specific personal or family genetic diseases the ability to screen the embryos for many specific disorders. All couples meeting our standard, liberal entrance criteria will qualify for the PGD process.

Aneuploidy screening as described above detects abnormal chromosome numbers and the diseases associated with those conditions. "Single gene disorders" include a wide variety of hereditary diseases found on a specific chromosome that can also be screened for with PGD.

Blastomere Biopsy

Blastomere biopsy (also known as embryo biopsy) is a technique that is performed during IVF when an embryo has reached the six to eight cell stage (about 72 hours or day three of embryo culture). One or two cells, or blastomeres, are separated from the rest of the embryo and removed from the zona pellucida, which is the shell surrounding the developing embryo. After removal of the cell(s), the developing embryo is placed back into the culture media and returned to the incubator where it can resume its normal growth and development. Preimplantation genetic diagnosis (PGD) can be performed separately on the removed cell(s).

At this early point of embryo development, all of the cells should be identical, and thus, removal of a cell from the embryo at this stage should not remove anything critical for normal development. An embryo should be able to compensate for the removed cell and should continue to divide following blastomere biopsy. However, a recent study suggested that a biopsy performed at the blastomere stage was responsible for a decreased chance that the embryo would be able to implant into the uterus later.

After obtaining cells from the embryo, they can then be analyzed using a variety of different techniques. It doesn't matter which of the eight cells was removed because, as the embryo divides, each subsequent generation of cells contains exactly the same genetic information as the "parent" cell. Thus, each of the eight cells should be identical.

However, at times there can be an aberration in the cell division in which one or more of the "daughter" cells ends up being slightly different from the parent cell. This is called mosaicism. Mosaicism is important when performing preimplantation genetic diagnosis via blastomere biopsy because it means it is possible that the cell that is biopsied may not be representative of the entire embryo. For example, if during PGD, a blastomere biopsy is performed and the cell that is obtained is abnormal, the entire embryo would considered abnormal, even though the remaining cells in the embryo may be normal. The opposite is also true. An embryo with seven abnormal cells and one normal can be considered normal if the "eighth" cell happens to be the one that is biopsied.

Embryo Transfer

Embryo transfer is done via the canal of the cervix to the uterus with the help of a slim, flexible catheter made of plastic. This process is fast and pain-free. For the embryo transfer, only the best morphology blastocysts are chosen to be transferred.

Single elective embryo transfer is recommended; this is the transfer of one of the "best" selected embryo into the uterus. This results in a clinical pregnancy rate of above 70 percent per embryo transfer in our donor assisted IVF programs and above 60 percent clinical pregnancy rate per transfer of frozen embryos.

The transfer of two embryos will not increase pregnancy rates considerably, but will raise the health risks for the mother and the fetus if a twin pregnancy occurs (22 percent chance of multiple pregnancy when transferring two embryos).

That is why EDU Fertility adheres to the concept of preserving our high success rates, not through the means of number of transferred embryos, but through the meticulous donor choice and laboratory excellence.

Treatment After Embryo Transfer

Once the embryo has been transferred into your uterus, you will continue to take estrogen and progesterone for 10 days before taking a pregnancy test (this will be a blood test). Should the test result be positive, you will carry out an ultrasound scan four weeks later to confirm your pregnancy.

You will continue with your hormonal medication until 12-13 weeks of pregnancy when the placenta becomes mature and produces enough hormones to support the pregnancy itself. From this term of pregnancy, you will not usually need more specific support than a naturally conceived pregnancy, and the prognosis of carrying it to the full term is very good. After most of your hormonal support is discontinued, you will take only progesterone, in a low dose, up to Week 32 to keep your cervix long, strong, and closed and to reduce the risk of a late miscarriage or an early birth.

We look forward to receiving your news about the result of your pregnancy test, so please inform us when you get your Beta hCG result. In case of a positive outcome, we will be glad to advise and support you further with all the necessary information.

If, however, the result is negative, we remain by your side to help you with any information you require – and to guide you in the next steps.

The miscarriage risk after a donor assisted IVF cycle/FET is no higher than that of a young woman in her 20s, using her own eggs. This is due to the several reasons:

1. The use of mature-grade eggs
2. The choice of the best quality embryo to transfer
3. The most efficient hormonal support

Please ask us for a video or telephone consultation; this will allow us to talk to you about your medical history and personally advise you about your ideal treatment plan, resulting in a live birth.

The Donor Assisted IVF Process

Consultation

The first step is an evaluation with one of our reproductive endocrinologists, who will discuss your treatment options and help you understand all aspects of the options available. If you decide to proceed with a donor ovum cycle, your doctor will tell you what you need to do to prepare. Your doctor will also perform a medical evaluation and physical examination to ensure your health wouldn't be jeopardized by pregnancy.

Cycle Preparation

To optimize the chances of success, your doctor will order several tests to identify and correct any abnormalities that could interfere with fertilization or implantation. These include a detailed semen analysis, a saline sonogram of the uterus, and basic blood tests evaluating blood count, blood type, and thyroid function. We also require that you're up to date on recommended health screenings, such as the Pap smear and, for women over 40, mammogram.

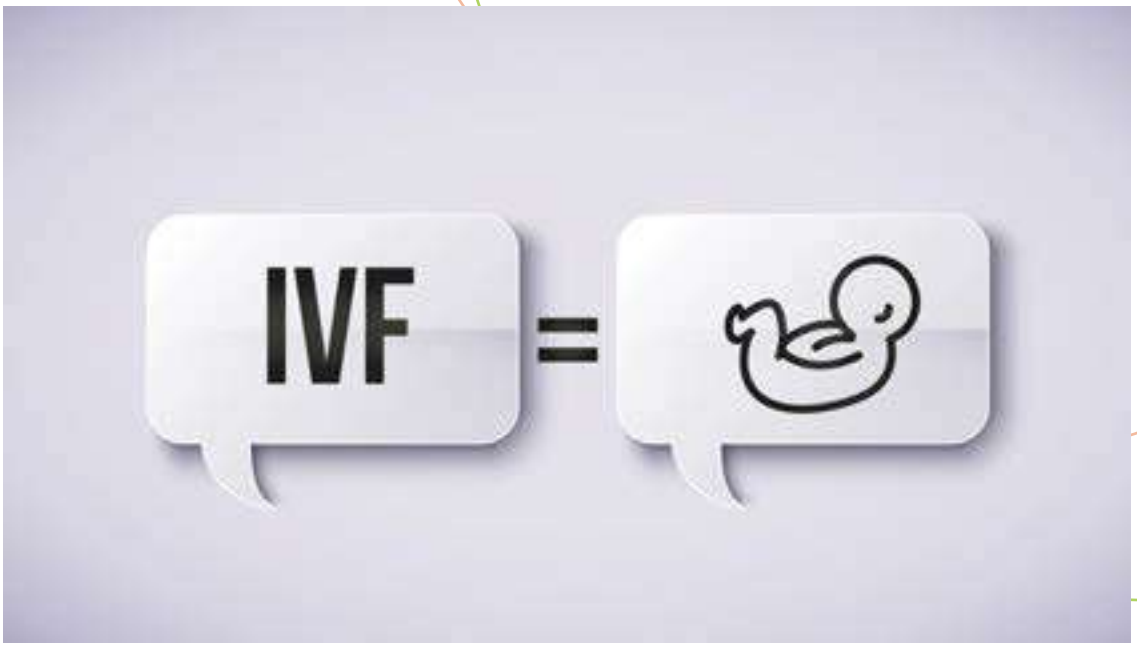
Though women achieve high success rates with egg donation throughout their 40s, the risks during pregnancy increase as women approach age 50. If you're 45 or older, we require additional testing to ensure you begin pregnancy in optimal physical condition. This testing includes a screen for diabetes, an EKG for your heart, and clearance by a perinatologist, an obstetrician who specializes in high-risk pregnancies.

Selection of Donor

Choosing a donor is an important step in the process, and a uniquely personal decision.

EDU Fertility offers an in-house online donor pool. You may also have a known donor, such as a relative, friend, or acquaintance who you'd like to work with. Your reproductive endocrinologist can help you determine if your known donor is a good candidate.

If you're working with our in-house donor pool, you will receive access to our online donor pool. You'll have access to information about the donor's background, medical history, educational level, and family history. You'll also have the option of viewing photographs of the donors. Our in-house donors have undergone extensive screening, and we'll discuss any relevant findings from the screening process, including genetic screening and testing, mental health screening, infectious disease results, and physical findings.



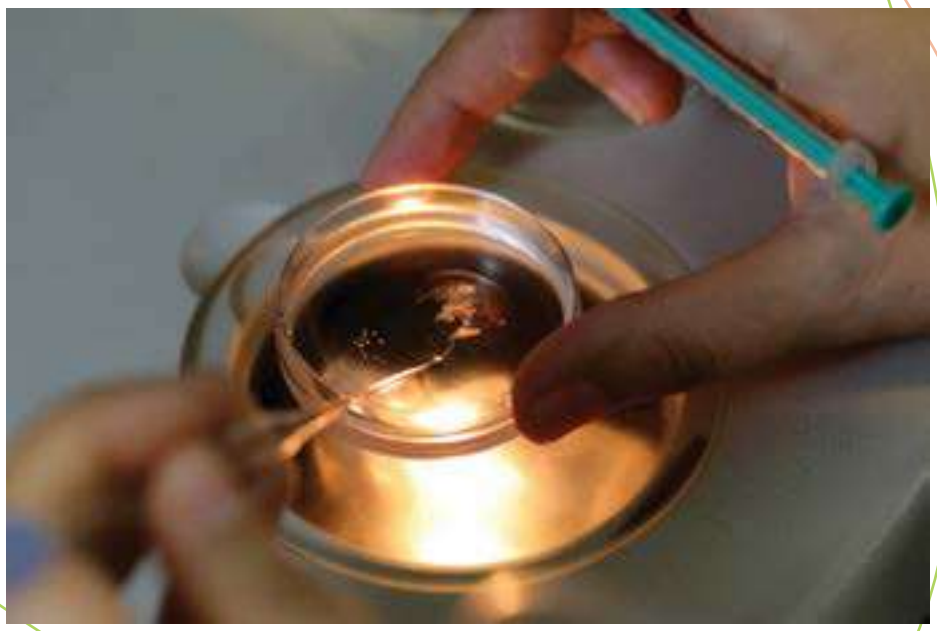
Once you've chosen a donor, the donor coordinator will confirm that she's free to go through the egg donation process during the time period requested. Then, information about your donor will be given to your doctor and nurse coordinator and your fresh cycle will be synchronized. If you are opting for cryopreserved embryos, you can prepare whenever you are ready for your frozen embryo transfer (FET).

Synchronization

The donor and recipient's cycles must be synchronized for a fresh embryo cycle so that the recipient's uterine lining will be ready for implantation when the donor's eggs are retrieved and fertilized. This is usually accomplished by administering birth control pills.

When the cycles are synchronized, the donor takes medications to stimulate the growth and maturation of a group of eggs. She's then monitored by ultrasound and blood tests for 10 to 14 days until the eggs are ready to be retrieved. Meanwhile, you will be taking different medication to prepare your uterine lining for implantation of the embryos.

Egg Retrieval and Embryo Transfer



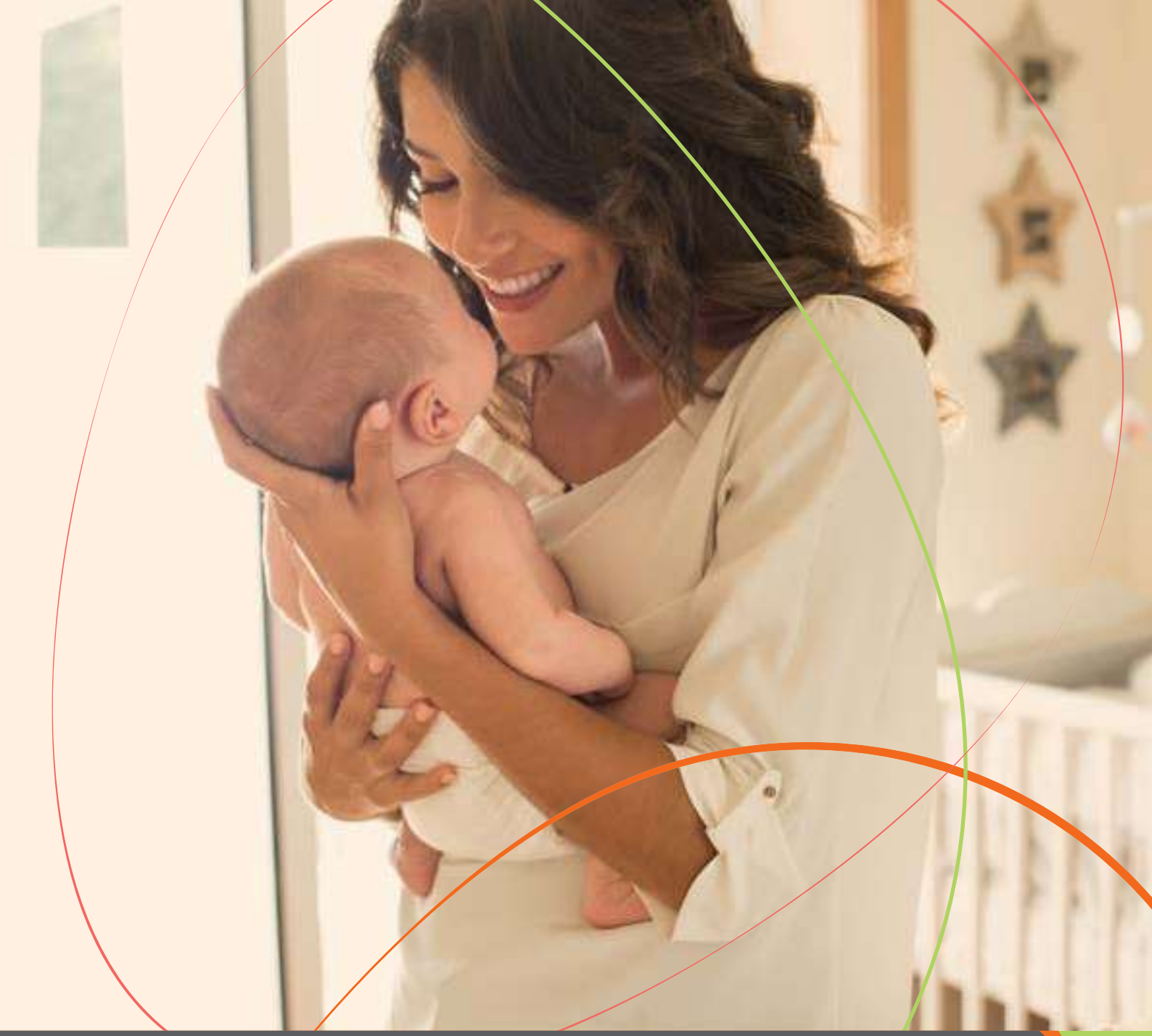
Once the donor's eggs reach maturity, an egg retrieval is scheduled. Your partner or sperm donor will provide a sperm sample on the day of the egg retrieval for insemination of the eggs. When the embryos reach the proper stage for transfer – usually day three – you will return to the clinic for transfer to your uterus.

We typically recommend transferring one or two embryos from donor cycles. The decision of how many embryos to transfer will be discussed in detail with you. The transfer of a single embryo reduces the risk of twins. Additional high-quality embryos from the cycle will be frozen and preserved to use at another time.

Deciding to Use Ovum Donation

Donor ovum can be a wonderful way for couples who can't conceive on their own to become parents. Nevertheless, deciding to pursue it can be a difficult process. Patients often come to this decision over time, after thinking hard about what becoming parents really means to them. Couples may consider other options, including adoption or not having children. Our psychologist is available to help you work through your thoughts and feelings about your various options.

If you would like a free consultation, please visit our website, Facebook page, or call to schedule your consultation.



Chapter 3

Uterine Health & IVF Success

EDU

Diagnostic Hysteroscopy

A hysteroscopy is a procedure used to examine the inside of the womb (uterus).

It is carried out using a hysteroscope, which is a narrow telescope with a light and camera at the end. Images are sent to a monitor so your doctor or specialist nurse can see inside your womb.

The hysteroscope is passed into your womb through your vagina and cervix (entrance to the womb), which means no cuts need to be made in your skin. A hysteroscopy can be used to investigate symptoms such as heavy periods, unusual vaginal bleeding, postmenopausal bleeding, pelvic pain, repeated miscarriages, or difficulty getting pregnant.

It can also be used to diagnose conditions such as fibroids and polyps (non-cancerous growths in the womb), and treat conditions such as removing fibroids, polyps, displaced intrauterine devices (IUDs), and intrauterine adhesions (scar tissue that causes absent periods and reduced fertility).

A procedure called dilatation and curettage (D&C) used to be common to examine the womb and remove abnormal growths, but now hysteroscopies are carried out instead.

What Happens During a Hysteroscopy?

A hysteroscopy is usually carried out on an outpatient or day-case basis. This means you do not have to stay in the hospital overnight.

It may not be necessary to use anesthetic for the procedure, although local anesthetic (where medication is used to numb your cervix) is sometimes used.

General anesthetics may be used if you are having treatment during the procedure or you would prefer to be asleep while it is carried out.

A hysteroscopy can take up to 30 minutes in total, although it may only last around 5-10 minutes if it is just being done to diagnose a condition or investigate symptoms.

Is a Hysteroscopy Painful?

This seems to vary considerably between women. Some women feel no or only mild pain during a hysteroscopy, but for others the pain can be severe.

If you find it too uncomfortable, tell the doctor or nurse. They can stop the procedure at any time. If you are worried, speak to the doctor or nurse before having the procedure about what to expect and ask them about pain relief options.

Transvaginal Ultrasound: 8 Reasons to Have One

A transvaginal ultrasound scan is a key fertility procedure to have if you want a baby. Most women have their first scan (abdominal, not vaginal) at the 12-week mark, once they're pregnant. But not everyone gets pregnant, and there's often a physical reason why. A transvaginal scan is a safe and effective way to check your cervix, uterus, fallopian tubes, and ovaries.

Fertility patients have routine transvaginal ultrasounds during treatment cycles. Why struggle to conceive only to have a transvaginal ultrasound diagnose a problem you could have spotted months earlier?

So what happens during a transvaginal ultrasound scan? A probe, lubricated with gel and covered by a condom, is inserted about three inches into your vagina. Not as scary as it sounds. Harmless sound waves (not x-rays) create computer-generated images of your pelvic organs. These photos are surprisingly clear – and they need to be to highlight problems. It's all over in 15 minutes. The procedure is usually painless.

What exactly does a transvaginal ultrasound scan look for?

Here are the top eight reasons for having one:

1. Find those fibroids and uterine septum.

Fibroids are benign growths in the uterus. One in four women have them, though they may not know it. Depending of their size and position, some fibroids or septums make it harder to get pregnant and increase the chance of a miscarriage. This is more likely when the fibroids grow into the uterine cavity. A transvaginal ultrasound spots fibroids and septums a mile off.

2. See those cysts.

Ovarian cysts are fluid-filled structures. Most are harmless and won't stop you from conceiving. Many come and go. But if you have endometriomas (cysts resulting from endometriosis) or cysts

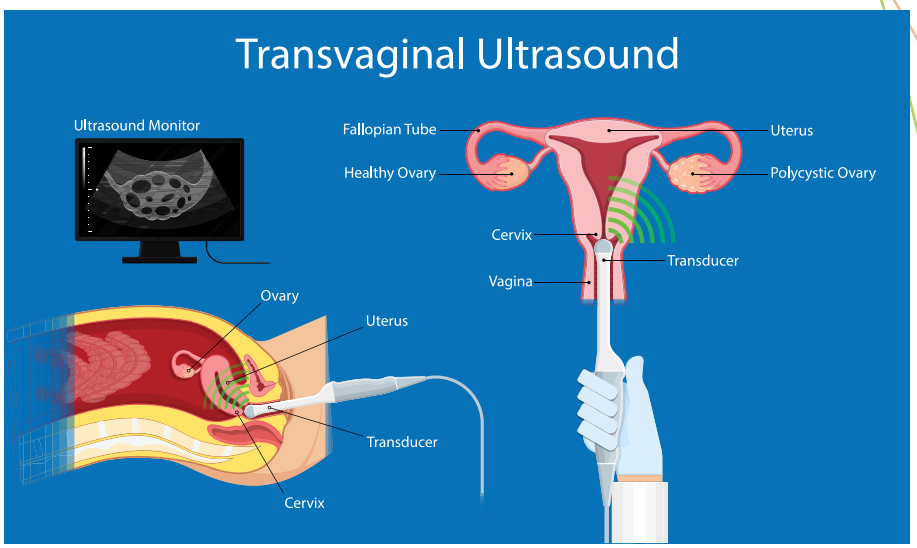
due to PCOS, your fertility could be affected. Transvaginal ultrasound examinations identify ovarian cysts with ease. And if the cysts look dodgy, there are things you can do.

3. Look at that lining.

TV scans love uterine linings. A transvaginal ultrasound scan performed mid-cycle measures of your endometrium down to the last millimeter. If it's too thin, at the point in your cycle where it should be optimally thick, this may be why you're not getting pregnant. In addition, if you are transferring donor eggs, donor embryos, or frozen embryos, a transvaginal scan of your lining during stimulation is essential. Uterine receptivity is everything.

4. Follow those follicles.

For women undergoing super-ovulation, transvaginal ultrasound tracking is crucial. TV scans get up close and personal, enabling the sonographer to accurately measure the quantity and size of your developing follicles. A typical patient needs one to four scans before her hCG trigger shot and egg retrieval.



5. Conception checker.

Fertility patients should always have an early (seven week) scan after a positive pregnancy test. This will check for an ectopic pregnancy, since the risk is higher following assisted reproduction. It can also spot other pregnancy problems, such as a blighted ovum. And of course, a scan will detect fetal heart activity. Transvaginal ultrasound is the optimal way to see all these things. (To be fair, a transabdominal scan can see a lot too.) We think all pregnant women should have a seven-week scan, not just fertility patients. Early checks reduce stress and save lives.

6. Home in on that hydrosalpinx.

A hydrosalpinx is a collection of fluid in the fallopian tube. It can severely hamper a natural pregnancy (blocked tube) and affect an IVF pregnancy (leaky fluid, wombs, and embryos are a bad combination). Hydrosalpinges are often seen by transvaginal ultrasound.

7. Pounce on your PID.

Pelvic inflammatory disease (PID) is not nice. And it can cause infertility. Your doctor may diagnose it based on touch and swabs. But a transvaginal ultrasound scan is a pretty good PID-identifier too. Early diagnosis is key.

8. Cross off cancer.

A TV scan can see female cancers of the lower organs better than an abdominal scan. Cancers of the uterus, vagina, ovaries, kidneys, and bladder are not that common in your reproductive years, but check for them anyway.

So that's why you need a transvaginal ultrasound scan. If you're thinking of starting a family, a scan is a no-brainer

Uterine Cavity Assessment

Approximately 15 percent of couples are affected with subfertility, of which up to 20 percent remain unexplained. Uterine cavity abnormalities can be a contributing cause of subfertility and recurrent implantation failure. Uterine cavity assessment has been suggested as a routine investigation in the evaluation of subfertile women.

Traditionally, hysterosalpingography has been the most commonly used technique in the evaluation of infertility. Transvaginal ultrasound scan allows visualization of the endometrial lining and cavity and has been used as a screening test for the assessment of uterine cavity.

Abnormal uterine findings on a baseline scan can be further evaluated with saline hysterosonography, which is highly sensitive and specific in identifying intrauterine abnormalities.

Hysteroscopy is considered as the definitive diagnostic tool to evaluate any abnormality suspected on hysterosalpingography, transvaginal ultrasound scan, or saline hysterosonography during routine investigation of infertile patients. Minimally invasive hysteroscopes have minimized the pain experienced by patients during the procedure and made it feasible to use hysteroscopy as a routine outpatient examination.

Following recurrent IVF failure, there is some evidence of benefit from hysteroscopy in increasing the chance of pregnancy in the subsequent IVF cycle, both in those with abnormal and normal hysteroscopic findings. Various possible mechanisms have been proposed for this beneficial effect, but more randomized controlled trials are needed before its routine use in the general subfertile population can be recommended.

What to Know About Endometrial Receptivity Analysis

Endometrial receptivity analysis (ERA) is a genetic test that takes a small sample of a woman's endometrial lining to determine which day would be the best day to transfer the embryo during an IVF cycle. Performing an endometrial receptivity analysis can be incredibly helpful as the window of endometrial receptivity can be one of the causes of infertility in women who have had two or more unsuccessful embryo transfers following in vitro fertilization (IVF).

How Does the Endometrial Receptivity Analysis Work?

An endometrial biopsy will be taken by your doctor in a mock embryo transfer cycle prior to your IVF or FET cycle. This sample will then be analyzed to assess endometrial receptivity and the optimal day for embryo transfer. The sample will be sent to a lab where molecular analysis is completed to determine the best time to attempt embryo implantation in a future transfer cycle. There are three potential results:

Pre-receptive: This indicates that the endometrium is not quite ready to receive the embryo and transfer at this time may not be ideal.

Receptive: This indicates that the moment the endometrial biopsy was taken was an optimal time to transfer the embryo for implantation.

Post-receptive: This indicates that the endometrium had reached the stage for optimal embryo implantation but has now gone past it.

Once your test results are complete and your endometrial receptivity is determined, they will be sent to your physician. He or she can then make any necessary adjustment to personalize your IVF protocol and schedule your embryo transfer around when your endometrium is receptive, and ready for the developing embryo to implant.

The Endometrial Receptivity Biopsy

One of the most frequent questions regarding the endometrial receptivity analysis and taking the endometrial biopsy is whether it's painful. The endometrial biopsy is an outpatient procedure that does not require admission to a hospital. Some patients have described having either mild discomfort during the procedure or mild cramping after. You can take over-the-counter pain medication to address any discomfort, but you should first consult with your doctor.

What is exciting in the reproductive field is that the technology continues to evolve. In November 2017, steps towards developing a new, non-invasive method to determine endometrial receptivity were led by Dr. Carlos Simon. This means that a painless method to determine endometrial receptivity, and other applications such as the microbiome, may be on the horizon. The endometrial liquid biopsy will be ready to use in what is being called "the niERA test" (non-invasive ERA), and in what is being called "the EMMA" (endometrial microbiome metagenomic analysis). This is something to stay tuned on, as these tests may be something that could help you on your path to parenthood in the future.

Should You Consider Endometrial Receptivity Analysis?

If you've just started trying to conceive, do not have a history of miscarriages, and/or have not previously undergone IVF, it may be early in the process to wonder about your endometrial receptivity. As a female, when you have an initial fertility consultation, the clinical team will first

look at your ovarian reserve and ovarian function. They will also typically perform an ultrasound to look at your ovaries and uterus and get a visual of your uterine lining. Assessing your endometrial receptivity is not something that is performed, unless the doctor feels it's warranted. If you have concerns or want to discuss this option, you should feel comfortable asking your physician about the ERA test.

Generally, the endometrial receptivity analysis is recommended if you've undergone two or more IVF cycles that were not successful, where the embryos were of good quality. If you have had two miscarriages or more, you may want to ask your doctor if pre-implantation genetic testing for aneuploidy (previously known as PGS) is something that they suggest, as it can help increase the chances of having a healthy baby and decrease your chances of a miscarriage.

Endometrial Receptivity Analysis Cost

If you're thinking that the endometrial receptivity analysis test sounds like it may be something to consider, speak to your doctor about it. Presently, insurance does not cover the test, but endometrial receptivity analysis costs can range from clinic to clinic and prices can vary. This is why it's a smart idea to speak directly to your physician or the finance department to get an idea so you can best budget ahead of time. In general, endometrial receptivity analysis cost can be anywhere from $800 to $1,000. While this is an added expense, if you and your doctor feel it will help improve the outcome of your next cycle, it is worth the investment.

When we think of having a family, we don't necessarily think of needing technology to help us. However, there are millions who have benefited from these procedures, tests, and technologies. There are so many doctors, nurses, geneticists, embryologists, genetic counselors, researchers, and more who work tirelessly to find solutions and insights to assist those who are diagnosed with a fertility concern. In the end, knowing what options you have to support you along your reproductive journey can make a powerful difference in helping you have a happy and healthy family!

Factors Affecting Pregnancy Outcomes

What are Intrauterine Adhesions?

The inside of the uterus is like a pocket with the front and back walls flat against each other. The pocket is lined with tissue called endometrium. During menstruation, the superficial (topmost) layer of the endometrium is shed. When a woman becomes pregnant, the embryo implants in the endometrium. Injury to and/or infection of the endometrium may damage the lining and cause formation of adhesions (scar tissue) between the inner walls of the uterus. Asherman syndrome is the term used to describe adhesions inside the uterus. The scarring can be mild with thin, stretchy bands of scar tissue or more severe with the formation of thick bands. In the most severe cases, partial or total destruction of the inside of the uterus can occur.

What are Potential Causes of Asherman Syndrome?

The most common cause of intrauterine adhesions is injury following a surgical procedure involving the cavity of the uterus. Dilatation and curettage (D&C) is a common outpatient surgical procedure during which the cervix (neck of the uterus) is opened and the tissue contents of the uterus are emptied. Intrauterine adhesions may form following a D&C performed for pregnancy complications such as uterine bleeding following childbirth or miscarriage, or less commonly, for gynecologic problems that involve the uterus. Other possible causes of adhesion formation are infections of the uterine lining (endometritis), removal of fibroids in the cavity of the uterus, and endometrial ablation (a surgical procedure that is used to intentionally damage the uterine lining to eliminate menstrual periods or make periods lighter).

What Symptoms are Associated with Asherman Syndrome?

A woman with intrauterine adhesions may have no obvious problems. Many women, however, may experience menstrual abnormalities such as absent, light, or infrequent periods. Other women may be unable to achieve pregnancy or may experience recurring miscarriages. They may also experience complications at the time of delivery due to abnormal implantation of the placenta. Less commonly, if the scar tissue blocks menstrual blood flow, Asherman syndrome can cause pelvic pain or painful menstrual periods.

How Do You Make a Diagnosis of Asherman Syndrome?

Asherman syndrome can be diagnosed by hysteroscopy, hysterosalpingogram (HSG), or sonohysterogram (SHG).

Hysteroscopy is the most accurate method to evaluate intrauterine adhesions and is a procedure in which a thin, telescope-like instrument is inserted through the cervix to allow the doctor to see directly inside the uterus. It can be performed in the office or may be done in the operating room. HSG and SHG are useful screening tests for adhesions. HSG is an x-ray procedure during which a dye that can be seen on x-ray is placed into the uterine cavity so that the shape of the inside of the uterus can be seen. During a saline ultrasound (SHG), a salt solution similar to normal body

fluid is infused through the cervix into the uterus and a sonogram machine is used to see the uterine cavity. In both HSG and SHG, the adhesions are seen as "filling defects," spaces where the fluid does not flow freely. These procedures do not require anesthesia, although non-steroidal anti-inflammatory medications (NSAIDs) may be used to decrease the cramping that occurs during the procedure.

How is Asherman Syndrome Treated?

Surgical removal of intrauterine adhesions with hysteroscope guidance is recommended. A special operating hysteroscope is used to cut away the scar tissue. This is frequently done under anesthesia. Following removal of the adhesions, many surgeons recommend temporarily placing a device, such as a plastic catheter, inside the uterus to keep the walls of the uterus apart and to prevent adhesions from reforming. Hormonal treatment with estrogen and NSAIDs are frequently prescribed after surgery to lessen the chance of reformation of adhesions. In severe cases, more than one attempt at surgical removal of the adhesions may be necessary.

Are There Any Long-Term Issues That I Need to be Concerned About?

Even after treatment, many patients continue to have difficulty with absent or infrequent periods. Pregnancies that occur after treatment are more likely to be complicated by miscarriage, preterm labor, third-trimester bleeding, and/or abnormal attachment of the placenta to the uterine wall (placenta accreta). The chance of a successful pregnancy after treatment correlates with the type and extent of the adhesions. After treatment, patients with mild to moderate adhesions usually experience return of normal menstrual function and have successful full-term pregnancy rates of approximately 70 to 80 percent. Alternatively, patients with severe adhesions or extensive destruction of the endometrial lining may have full-term pregnancy rates of only 20 to 40 percent after treatment. Women with extensive damage to the endometrium that does not improve after treatment may consider other options such as adoption or in vitro fertilization (IVF) using a "gestational carrier," where another woman carries the pregnancy for the mother.

Uterine Fibroids, Endometrial Polyps, and Ovarian Cysts

Uterine fibroids are non-cancerous muscle growths within the walls of the uterus.

Endometrial polyps are abnormal tissue growths within the endometrium, the inner lining of the uterus.

Ovarian cysts are fluid-filled sacs on one or both ovaries that usually form during ovulation.

Symptoms of fibroids, polyps, and cysts vary, but these structural abnormalities can all contribute to pelvic pain, abnormal uterine bleeding, and other complications including infertility.

Treatment for fibroids, polyps, and cysts depends on symptoms and patient goals and includes conservative, non-surgical methods as well as surgical intervention when necessary.

Uterine Fibroids

Uterine fibroids, which are also called leiomyomas or myomas, are benign (non-cancerous) muscular growths within the walls of the uterus. In fewer than 1 in 1,000 cases, what was thought to be a uterine fibroid may be a cancerous mass. They range in size from three-quarters of an inch to several inches in diameter.

According to a study published in *The American Journal of Obstetrics and Gynecology*, fibroids affect up to 70 percent of white women and between 80 to 90 percent of African-American women by age 50. They often do not cause any symptoms and are frequently detected incidentally during a routine examination.

Symptoms of Uterine Fibroids

Fibroids often cause heavy and painful periods, abnormal uterine bleeding, and pelvic pain and pressure in patients. In addition to discomfort, fibroids may also cause pregnancy complications and/or infertility. Symptoms of uterine fibroids include:

- Changes in the menstrual cycle, including heavy or prolonged bleeding
- Abdominal and pelvic cramping
- Lower back pain
- Pain or pressure during intercourse
- Frequent or difficult urination
- Recurrent miscarriages
- Infertility

If fibroids are suspected or discovered in a routine pelvic exam, an OB-GYN will first aim to fully assess their size, number, and position. This can be done using a variety of imaging methods including ultrasound and hysteroscopy (a thin tube with a camera inserted through the vagina to examine the uterus).

More advanced imaging techniques such as magnetic resonance imaging (MRI) scans and computerized tomography (CT) scans may be ordered in more complex cases.

Uterine Fibroids Treatment

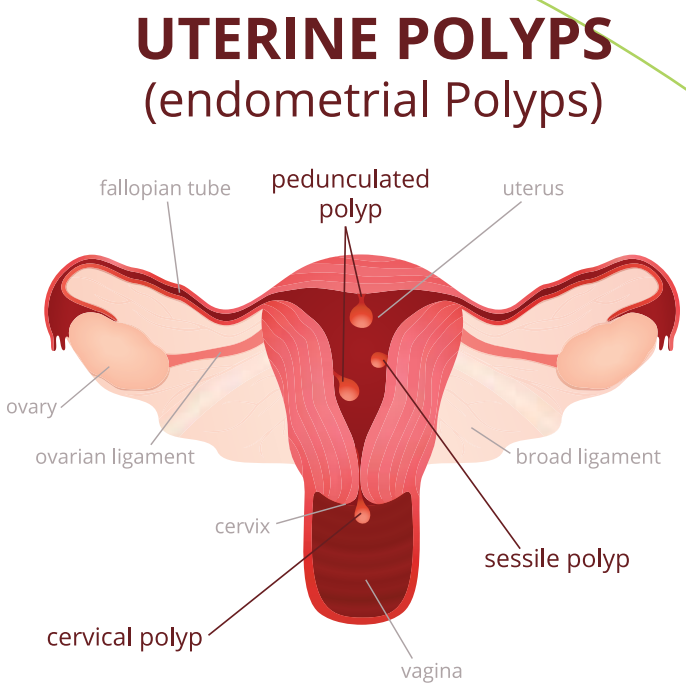
Determining the appropriate treatment for fibroids depends on several variables including severity and type of symptoms, to what degree the fibroids are affecting the body's ability to function normally, and whether or not a woman wishes to get pregnant in the future.

Over-the-counter pain medication can sometimes relieve uterine fibroid symptoms. Hormonal medications, including certain birth control medications, can be very effective in reducing the pain and heavy bleeding caused by fibroids, provided the woman does not wish to become pregnant.

Women who are actively trying to get pregnant or wish to preserve their future reproductive options may opt to have fibroids surgically removed while leaving the uterus intact. Surgical removal of the fibroids alone is called a myomectomy.

Other options for fibroid removal include uterine artery embolization (UAE), a procedure that eliminates blood vessels that supply the fibroids, and MRI-focused ultrasound therapy that is a non-surgical technique using high-intensity ultrasound waves to destroy fibroids. Pregnancy is not recommended after these procedures.

A hysterectomy will provide definitive treatment. This is the surgical removal of the uterus and can be performed in various degrees and with different surgical approaches.



Endometrial Polyps

Endometrial polyps, also called uterine polyps, are abnormal tissue growths on the inner lining of the uterus. Most of the time, endometrial polyps are not cancerous (benign), but they can sometimes develop into cancer if left untreated.

Since women of reproductive age shed the inner lining of the uterus during menstruation, endometrial polyps are more common in women that have gone through menopause. However, they can affect women of all ages.

Symptoms of Endometrial Polyps

Like fibroids, endometrial polyps may or may not cause symptoms, depending on their size, number, and location. Symptoms of endometrial polyps include:

- Post-menopausal vaginal bleeding
- Bleeding between menstrual periods
- Very heavy bleeding during menstrual periods
- Bleeding after intercourse or exercise

If endometrial polyps are suspected, imaging techniques such as ultrasound and hysteroscopy are usually used to confirm their presence. If polyps are found, an OB-GYN will take a small tissue sample for a biopsy to check for cancer or precancerous cells.

Endometrial Polyps Treatment

Sometimes polyps will go away over time without treatment. If endometrial polyps are identified in an exam and a woman is not experiencing severe symptoms and is not at risk for cancer, she may be advised to wait and see if the polyps resolve on their own.

Usually, an OB-GYN will recommend the removal of symptomatic endometrial polyps, and removal will always be advised if there is concern for cancerous or precancerous cells. Hysteroscopy is performed to remove polyps. This involves using a lighted tube and camera called a hysteroscope, which is inserted through the vagina. The surgeon will insert small instruments through the tube to remove the polyps.

Hormonal medications may be prescribed for short-term relief of symptoms caused by polyps, but may not eliminate the polyps themselves.

Ovarian Cysts

Ovarian cysts are fluid-filled sacs that may develop on one or both of a woman's ovaries. The ovaries are responsible for producing female reproductive hormones as well as releasing an egg each month during ovulation. The most common types of cysts form during ovulation when one of the follicles on the ovaries responsible for releasing an egg fails to open.

In most cases, these cysts will go away in a few months without treatment and without causing symptoms. Because most ovarian cysts form during ovulation, they are far less common in women who have gone through menopause.

Complications arise when cysts become abnormally large. Less commonly, cysts may rupture or cause ovarian torsion, a condition in which the ovary is abnormally twisted due to the cyst. In rare cases, ovarian cysts can be cancerous. Additionally, some women produce many small cysts on their ovaries due to a condition called polycystic ovary syndrome (PCOS). PCOS is a common cause of infertility in women.

Symptoms of Ovarian Cysts

The majority of ovarian cysts will not cause symptoms. When they do, the symptoms include:

- Bloating
- Abdominal pressure

- Pelvic pain
- Pain during intercourse
- Frequent and/or difficult urination
- Sudden, sharp pain due to a ruptured cyst

Women experiencing sudden and severe pain should seek immediate medical help, particularly if the pain is accompanied by vomiting or fever.

When ovarian cysts are suspected during an exam, an OB-GYN will determine whether or not further testing is needed. This is usually done via pelvic ultrasound.

If further evaluation is needed, laparoscopic surgery may be used to investigate ovarian cysts. This minimally invasive technique uses a small incision and a camera to help guide the surgeon. Laparoscopy may also be used to surgically remove the cysts.

Ovarian Cysts Treatment

Since ovarian cysts often resolve on their own without treatment, a period of watchful waiting may be recommended if a cyst is identified during a routine examination. Periodic pelvic ultrasounds may be used to monitor the growth and development of the cyst.

Oral contraceptives (birth control) may be prescribed to prevent the formation of ovarian cysts during ovulation.

If surgical intervention is necessary, ovarian cysts can often be removed while keeping the ovaries and other pelvic organs intact. This is called a cystectomy. In more severe cases, an oophorectomy (removal of one or both ovaries) may be necessary.

The first step in preventing complications from fibroids, polyps, and cysts is a routine pelvic exam.

Uterine Septum

What is a Uterine Septum?

A uterine septum is an upside-down, triangular-shaped piece of tissue which divides all or part of the uterine cavity in two. The tissue is a left over remnant from normal, embryonic uterine development and is most commonly discovered with an HSG (hysterosalpingogram). A septum can also be discovered with a 3D ultrasound and a skilled observer will also detect the septum using a regular 2D ultrasound machine in a correct plane. The septum may frequently be overseen on routine ultrasound scans, particularly in cases when it is very small/short.

At six weeks gestation, the uterus forms from two hollow, parallel cylinders which fuse together. The internal walls of the cylinders are supposed to subsequently dissolve in an inferior to superior manner, leaving a single uterine cavity. If the internal walls do not dissolve completely, some tissue remains towards the top of the uterus. This tissue comprises the uterine septum.

How Does a Septum Affect Fertility and Miscarriage?

Women with infertility and recurring miscarriages are more likely to have a uterine septum. However, it is not known how many women with normal reproductive histories also have a uterine septum. This is important because a uterine septum does not always cause problems. With that being said, in women with history of miscarriage, infertility, or pre-term delivery, with a uterine septum, we believe that the septum likely contributes to their difficulties.

There are two theories as to how a uterine septum is detrimental to reproduction. First, because the tissue of a uterine septum tends to be fibrous and mostly avascular, it does not have the same rich blood supply as the rest of the uterus. An embryo that implants over the septum, therefore, may not be able to obtain the nutrients it needs to grow, eventually leading to miscarriage. Some

experts believe that this phenomenon may occur very early in gestation, preventing detection or even a positive pregnancy test.

The second manner in which a septum can be detrimental is by decreasing the space for the pregnancy inside the uterus. As the pregnancy grows, the limited space can cause uterine contractions leading to miscarriage or pre-term delivery.

What Can Be Done About a Uterine Septum?

Patients with a uterine septum and history of miscarriage, pre-term delivery, or those planning an advanced fertility treatment such as IVF may undergo surgical correction of their septum. During this outpatient procedure, a camera (hysteroscope) is inserted into the uterus through the cervix. A wire loop with electrical current is extended through the camera and applied to the septum tissue. As the septum is incised, the tissue springs back into the uterine wall creating a normal uterine cavity. The same procedure can be performed using saline distension and no electricity at all. Since there are many different types of septa and also different ways to manage them, we will be glad to provide you with a consultation and suggestion on how to manage this condition.

The procedure is relatively straightforward and usually uncomplicated. As with all surgical procedures, however, there are some risks. If you are going to have a septum surgery, some of the risks you may want to ask your doctor about include scarring of the uterine cavity, perforation of the uterus, incomplete resection of the septum, and fluid overload.

The removal procedure is a day surgery that does not require hospitalization.

Endometriosis and Infertility: What You Need to Know

Endometriosis is a disease that affects women of reproductive age and that may be associated with both pelvic pain and infertility. Scientific advances have improved our understanding of this benign (non-cancerous) but sometimes debilitating condition. And modern medicine now offers women with endometriosis many treatment options for relief of both pain and infertility.

But much remains unknown. Women who have been diagnosed with endometriosis may wonder what this means for their future fertility. Similarly, women experiencing infertility may wonder whether they have endometriosis and how that may affect their prognosis. To quote a recent committee opinion from the American Society for Reproductive Medicine (ASRM), "Treatment of endometriosis in the setting of infertility raises a number of complex clinical questions that do not have simple answers."

Here we aim to address the concerns of women facing endometriosis and/or infertility and answer their most pressing questions. Armed with this fundamental knowledge, women can take action to optimize both their own health and fertility.

What is Endometriosis?

Endometriosis is a disease involving growth of tissue resembling the endometrium (uterine lining) in places outside the uterus. In the ovaries, cysts known as endometriomas or "chocolate cysts" may form. Implants of endometriosis may grow on the peritoneum (the lining of the abdomen and pelvis), sometimes causing scarring that may involve the ovaries and block the tubes. In some women, endometriosis grows deep beneath the peritoneal lining, such as in the area between the vagina and the rectum. These cases are often associated with more severe pain, but not necessarily more severe infertility. Although you or your physician may suspect endometriosis

based on signs, symptoms, and findings on physical exam, the only way to definitively diagnose endometriosis is with a surgical procedure called a laparoscopy.

The cause of endometriosis is not known, although it often runs in families. Numerous biochemical and immunological changes have been identified in association with endometriosis, but it is unclear which may contribute to endometriosis and which simply results from it.

What Treatments are Available for Endometriosis?

Birth control pills help relieve pelvic pain in many women, including those with endometriosis. Women whose symptoms continue despite the pill should discuss with their doctor undergoing a laparoscopy to see if they have endometriosis, which can often be treated surgically at the time of the laparoscopy. Surgical treatment for endometriosis has been shown to improve fertility, but women not ready to become pregnant are encouraged to resume the pill to prevent endometriosis from recurring. Stronger medications, such as leuprolide acetate, are effective to treat pain related to endometriosis, but not infertility.

I Have Been Diagnosed with Endometriosis, But I am Not Yet Ready to Try to Conceive. What Can I Do to Maximize My Future Fertility?

The birth control pill is commonly prescribed to reduce menstrual cramping and help prevent endometriosis recurrence. Preventing endometriosis can help preserve fertility, so the pill is an excellent treatment option following endometriosis surgery if you are not yet ready to become pregnant.

Women with endometriosis should also strongly consider consulting with a fertility specialist (a specialist in reproductive endocrinology/infertility), even if they are not yet ready to try to conceive. This is particularly important if you are over 30 or if you have “decreased ovarian reserve.” Fertility in women decreases with age. In addition to age, “ovarian reserve” also helps predict your ability to conceive. Ovarian reserve is most easily measured with a simple blood test called AMH (anti-mullerian hormone).

Surgery to remove or destroy endometriosis involving the ovaries may also reduce ovarian reserve and thus lower a woman’s chances for pregnancy, even with fertility treatment such as IVF. Women with moderate to severe endometriosis may have scarring that can prevent the egg from entering the fallopian tube. Mild and minimal endometriosis are also associated with infertility, so all women with endometriosis need to consider the impact endometriosis may have on their fertility. A newer option is for women to freeze eggs for possible future use in the event they experience infertility. Unfortunately, egg freezing is costly and is usually not covered by insurance.

If I Have Infertility, Is It Important to Know Whether or Not I Also Have Endometriosis?

No. In the 20th century, it was standard for all women with infertility to undergo laparoscopy to see if they had endometriosis. Today, women with regular ovulatory cycles, patent fallopian tubes, normal ovarian reserve, and a partner with a normal semen analysis are said to have unexplained infertility, though some of these women undoubtedly have endometriosis. Infertility treatments and success rates are generally similar for women with endometriosis-related infertility and women with unexplained infertility. Very few infertile women who undergo laparoscopic treatment of endometriosis become pregnant as a result. But laparoscopy may be a good option for women suffering from pelvic pain along with infertility, as well as for women who do not consider IVF to be an option.

I Have Endometriosis and Now I am Also Experiencing Infertility. How Will This Affect My Treatment?

It is helpful to bring the records from your surgery to your fertility specialist. Knowing the severity of your endometriosis, whether it appears to have caused extensive scarring, and whether it has affected your ovarian reserve will help you and your doctor plan the most appropriate course of treatment. Although pregnancies do occur naturally in women with endometriosis, pregnancy rates are superior with IVF. Women with low ovarian reserve who do not conceive with IVF using their own eggs generally have an excellent prognosis with donor egg IVF.

My Doctor Tells Me I May Need Another Operation for My Endometriosis. How Will This Affect My Fertility?

Surgery to diagnose and destroy endometriosis can improve fertility, but repeat surgery is generally not beneficial and may cause harm by reducing ovarian reserve. Large endometriomas may need to be removed surgically prior to IVF, but smaller ones are generally best left in place. Consider consultation with a fertility specialist before undergoing another operation.

PCOS and Infertility – Symptoms and Treatment

What is PCOS?

Polycystic ovary syndrome (PCOS) is a very common endocrine condition in reproductive-aged women. It affects approximately 5-10 percent of young women and often leads to difficulty conceiving. Women with this condition can experience irregular periods, abnormal hair growth, acne, and can have ovaries containing multiple small cysts.

PCOS and Infertility

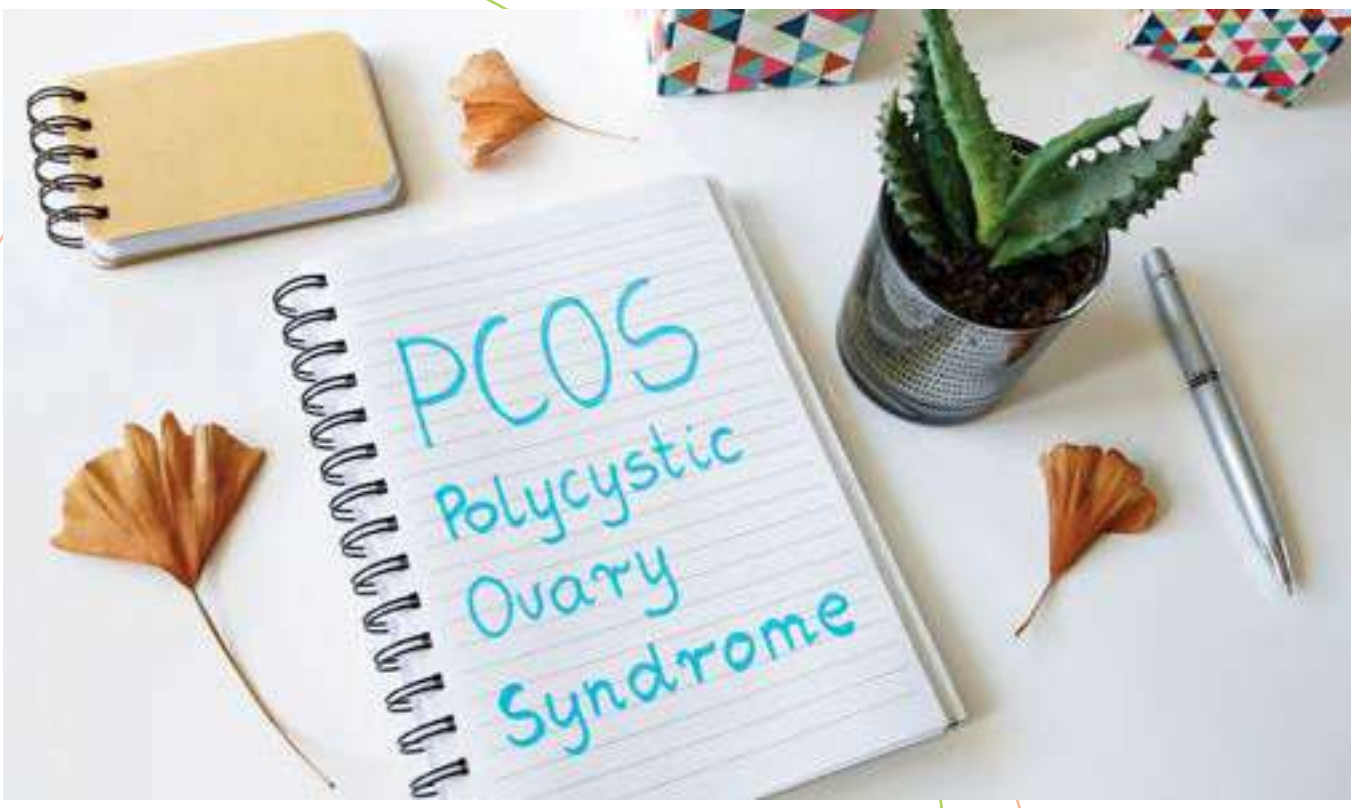
PCOS negatively impacts fertility because women with the condition do not ovulate (release an egg) each month due to an overproduction of estrogen by the ovaries. Because ovulation does not occur regularly, periods become irregular and increased levels of hormones such as testosterone can affect egg quality, inhibit ovulation, lead to insulin resistance, and increase the risk disorders such as gestational diabetes.

Is it Possible to Get Pregnant with PCOS?

While it's not impossible for a woman with PCOS to get pregnant on her own, many women do need to seek care from a fertility specialist.

PCOS and Fertility Treatment

For those women trying to conceive a pregnancy, the first step in treatment of PCOS is lifestyle modification, including a healthy diet and exercise. Diets shown to be most successful in PCOS patients include those with lower carbohydrates and a reduced glycemic load. Recommended exercise in PCOS patients is at least 30 minutes of moderate exercise three times per week, with daily exercise being the ultimate goal.



Women who still have infrequent ovulation despite lifestyle modifications may require fertility medications to assist with the release of an egg from the ovary. Typical initial therapy for patients with PCOS who do not ovulate and are trying to conceive includes administration of certain fertility medications. These agents are selective estrogen receptor modulators.

For some women with PCOS, fertility tablets do not result in ovulation or pregnancy, and they require fertility injections to release an egg. Fertility injections (Follistim®, Gonal-F®, Bravelle®, and Menopur®) contain the same hormone the brain releases to signal the ovary to produce eggs. Rather than producing one egg in a month, most women on fertility injections will produce two or more eggs. This treatment requires closer monitoring with transvaginal ultrasounds and several blood draws to determine the woman's estradiol level, which is a hormone produced in the ovary. Fertility injections are also associated with an increased risk of multiple births.

In some instances, women with PCOS require in vitro fertilization (IVF) to achieve a healthy pregnancy. In this scenario, daily fertility injections are used to stimulate the ovaries to produce multiple eggs, which are harvested in a minor procedure. The eggs are fertilized in the lab, and then a resulting embryo (fertilized egg) is transferred into the woman's uterus. Additional embryos can be frozen (cryopreserved) for future use.

What are PCOS Health Risks?

As previously mentioned, insulin resistance can occur in women with PCOS. A simple blood test can determine if a person is insulin resistant. If the test indicates insulin resistance exists, women with PCOS may be treated with a medication called metformin (trade name Glucophage).

Hyperlipidemia, or elevated cholesterol and/or triglycerides, can occur in PCOS women as well. Women can be screened for this condition with a fasting blood sample. Screening for hyperlipidemia is very important since this condition can lead to cardiovascular disease later in life.

Women with PCOS appear to be at increased risk for endometrial (uterine) cancer later in life due to persistently higher levels of circulating estrogens. Since menstrual periods do not occur regularly, overgrowth of the uterine lining can occur and in some cases can lead to a malignancy.

Women with PCOS also have an elevated risk of ovarian torsion (twisted ovary).

Chapter 4

Post-implantation

EDU

Everything You Need to Know About Implantation

If you're trying to get pregnant, you've probably done your fair share of googling around implantation. There are many facts, questions, and misconceptions swirling around about this incredible part of early pregnancy; it can be confusing. It's time to set the record straight.

From timelines and testing to signs and symptoms, welcome to your one-stop shop on all things implantation.

What is Implantation?

Though you won't know you're pregnant until you see those two pink lines, your body has been hard at work from the moment conception occurred. There's a lot going on behind the scenes, and it all starts with implantation.

Implantation is the time when the fertilized egg successfully attaches and implants into the lining of the uterine wall. Although the egg may have been fertilized over a week before, it's only after implantation that your body starts producing hCG – human chorionic gonadotropin, also known as the hormone that's picked up by pregnancy tests.

When Does Implantation Occur?

Sperm meets egg, and 40 weeks later, it's baby time! Sounds simple, right? Let's back things up a bit, Biology 101 diagram-style.

Your ovary will release an egg into your fallopian tube, and if you had sex up to about a week prior to ovulation, sperm will be waiting in your fallopian tube. If fertilization is successful (yay!), the egg will begin to divide and travel down your tube toward your uterus. This process usually takes about a week; after that, implantation happens.

On average, implantation occurs about 8-10 days after ovulation, but it can happen as early as six and as late as 12. This means that for some women, implantation can occur around cycle day 20, while for others, it can be as late as day 26. This is part of the reason why counting your pregnancy weeks can be confusing.

How Long Does Implantation Last?

Although most pregnancies are 40 weeks, the process of implantation represents only a fraction of that time. Implantation typically lasts only a few days.

Once it's complete and the fertilized egg – now called an embryo – is burrowed snugly inside your uterine wall, it will begin to produce hCG. Your body's progesterone levels will also begin to rise, nourishing your uterine lining and preventing your period from beginning.

Beta Pregnancy Confirmation After Your Embryo Transfer

Then comes the determination of the levels of the hormone beta-hCG in blood. The hormone produces the embryo and passes to the mother via the placenta. This is the first measurable sign of embryo implantation.

During an in vitro fertilization treatment, it is performed 13 or 14 days after the egg collection.

When it comes to egg donation treatments or frozen embryo transfers, it is taken 13 or 14 days after starting the administration of progesterone. The standard waiting period is seven days after a blastocyst transfer and nine days for a three-day embryo.

What Does Implantation Feel Like?

There are a lot of misconceptions around whether or not someone can actually feel implantation, so let's set the record straight.

For most people, implantation feels like nothing at all. Some report feeling implantation symptoms like mild cramping right around the time of implantation, but doctors aren't certain if there's even an association between the two. Do your best to stay cool, calm, and collected during that two-week wait – just because you're not feeling any implantation symptoms doesn't mean it's not happening.

Implantation Symptoms

Since there's no real correlation between when implantation happens and actual implantation symptoms, it's best to think instead about implantation symptoms and how they relate to early pregnancy.

The most common implantation symptoms of early pregnancy include the following:

- **Implantation cramps.** Some women may notice some minor cramping right around the time implantation is taking place. Though there's no way to know for sure what's actually going on, what we do know is that this cramping is due to the rise in progesterone that occurs during the second half of your cycle, whether you're pregnant or not.
- **Implantation bleeding.** Defined as a small amount of bleeding or spotting that can occur after conception and a few days before your menstrual cycle, implantation bleeding is light, stops on its own, and doesn't require treatment. It's experienced by about one-third of all pregnant women, although there's no scientific data that proves the correlation between implantation and bleeding.
- **Nausea.** Often some of the first tip-offs that something might be up, nausea and vomiting are popular – and unpleasant – implantation symptoms in early pregnancy. You may also start noticing changes in your appetite or that you're getting grossed out by foods you previously loved.
- **Tender breasts.** As your hormones change, you may notice your breasts starting to swell and feeling a lot more sensitive than usual.
- **Constipation and bloating.** Things feeling like they're starting to slow down? You can thank those pregnancy hormones yet again for constipation, a common implantation symptom. You may also notice you're looking extra bloated during this time, so it might be time to break out the leggings.
- **Fatigue.** Growing a baby is hard work! If you're feeling more tired than usual, that's often a sign of early pregnancy, caused by a rise in progesterone and increased blood volume.
- **Headaches.** Another side effect of your increased blood volume during pregnancy, headaches are a common implantation symptom.
- **Mood swings.** Notice yourself getting extra bothered by even the smallest of things? Mood swings are a common implantation sign during early pregnancy.

IVF Implantation Failure

Repeated implantation failure (RIF) is determined when embryos of good quality fail to implant following several in vitro fertilization (IVF) treatment cycles. Implantation failure is related to either maternal factors or embryonic causes. Maternal factors include uterine anatomic abnormalities, thrombophilia, non-receptive endometrium, and immunological factors. Failure of implantation due to embryonic causes is associated with either genetic abnormalities or other factors intrinsic to the embryo that impair its ability to develop in utero, to hatch, and to implant. New methods of time-lapse imaging of embryos and assessment of their metabolic functions may improve selection of embryos for transfer, and subsequent outcomes for IVF patients, as well as for those diagnosed with RIF. This review discusses the various causes associated with RIF and addresses appropriate treatments.

Introduction

Repeated implantation failure is determined when transferred embryos fail to implant following several in vitro fertilization treatment cycles. However, there are no formal criteria defining the number of failed cycles or the total number of embryos transferred in these IVF attempts. Accordingly, different fertility centers practicing IVF may use different definitions for RIF. Considering the current success rate of IVF treatments and the mean number of embryos transferred in each cycle, it is recommended to define RIF as failure of implantation in at least three consecutive IVF attempts, in which one to two embryos of high grade quality are transferred in each cycle.

The process of implantation involves two main components: a healthy embryo that should have the potential to implant and a receptive endometrium that should enable implantation. The “cross-talk” between the embryo and the endometrium that finally leads to apposition, attachment, and invasion of embryos is mandatory for successful implantation and subsequent normal placentation. These processes are under thorough investigation and seem to involve many mediators originating in the embryo, as well as in the endometrium; they seem to involve the maternal immunologic system as well. Any abnormality attributed to the embryo, the endometrium, or the immune system will result in implantation failure. Therefore, in assessing RIF, the embryo should be evaluated, with reference to the uterus and its functional endometrium. Accordingly, treatment of RIF should be targeted to the abnormality detected, and the correction of any potential malfunction that might contribute to the failure of implantation.

Why Does In Vitro Fertilization Sometimes Fail?

Failed IVF is a frustrating situation for couples and their fertility doctors.

There is an equation that we can use to illustrate the implantation process: Embryo quality + receptivity of uterine lining = chance for implantation and pregnancy.

We know that many human embryos will arrest (die) before day five. Unfortunately, embryonic arrest also occurs after day five. Some of the embryos that we transfer that "look good" will die after we put them in the uterus. This is the explanation for IVF failure in the large majority of cases. The problem is rarely the sperm, and uncommonly the uterus. It is usually a weakness in the embryo that leads to failed implantation.

On average, only about 25 percent of transferred embryos continue to develop and become children. This percentage of implanting embryos is greatly dependent on female age: we see about 45 percent implant under age 35 and 1 percent implant at age 40-42.

Patients Who Fail IVF Will Often Ask:

1. "Why didn't the embryos stick, did you put them in the right spot?"
2. "What's wrong with my uterus? It's not accepting the embryos."
3. Sometimes, after repeated failure to implant any embryos with IVF, women will say, "Obviously, I need a surrogate to carry the embryos because my uterus can't do the job."

Although this could be logical, it does not fit with the science. When IVF does not work after numerous attempts, switching the uterus is not likely to result in success. However, the egg donation experience teaches us that switching to eggs from a young egg donor would be very likely to be successful. This tells us that the problem is not the uterus but is the egg quality.

Some animal species have much higher implantation rates per embryo transferred than humans do. Human IVF is not as efficient due to the relative weakness of the human egg as compared to those animal species.

This is not to say that the sperm and the uterus are not sometimes contributing factors in the IVF success equation. However, the sperm and the uterus are relatively minor factors as compared to the major factor of egg quality.

Genetic and Chromosomal Issues Causing Failure of Implantation in IVF

We know that one of the major factors contributing to in vitro fertilization failure is the high rate of chromosomal abnormalities in human embryos.

As women age, the incidence of chromosomal abnormalities in mature eggs increases significantly. Studies have shown that starting in the early 30s, the rate of chromosomal abnormalities in human eggs (and therefore in human embryos) starts to increase significantly.

The rate continues to increase with advancing female age so that by the mid-40s, a very high percentage of human embryos are chromosomally abnormal (over 75 percent). It is believed that this is mainly due to problems with the spindle apparatus in the egg nucleus. The spindle is involved with properly lining up and segregating the chromosomes as the egg matures at the time of ovulation. Older eggs have an inefficient spindle apparatus that does not line up the chromosome pairs properly and “mistakes” are made when splitting pairs of chromosomes. This leads to eggs that do not have the proper balance of 23 chromosomes, and it will result in a chromosomally abnormal embryo if fertilized. It has been shown that about one to two percent of human sperm are chromosomally abnormal on the average, as compared to about 20 to 90 percent of human eggs (depending on female age).

PGS (preimplantation genetic screening) can be done on embryos prior to transfer to evaluate chromosomal competence.

Other “Genetic Causes” of Implantation Failure

1. Implantation failure is probably sometimes caused by other genetic mutations, with a perfectly normal “karyotype” or chromosome complement.
2. There are tens of thousands of genes in the human genome, which means that there are many places where something can go wrong.
3. With time, there will be genes discovered that are crucial for efficient embryo implantation, both on the embryo side and on the uterine side, and perhaps involving the immune system as well.

What to Expect After an Embryo Transfer

The Day of the Transfer

After patients are released from the clinic, they are sent home with instructions to go about the rest of the day and ensuing two weeks with normal, reduced activity. There is no need to be on bed rest. All our patients have different medication protocols that they go home with.

The 12-Day Wait

We have now come to the end of the IVF procedure and the *maximum* that our technology can help a person to achieve a pregnancy. We are at the point where we have to wait to see if the next steps happen on their own. If a Day 3 transfer was done, it will take approximately seven days for the remainder of the process to be completed and for the pregnancy test to be positive. For that reason, you can do your pregnancy tests at eight or nine days post-transfer. For a blastocyst transfer, you only need three more days to get a positive pregnancy test.

Some clinics want to be absolutely sure, so they wait for 12 days, but the problem with that protocol is that an early chemical pregnancy will be missed. It is important to know because it verifies that the patient can become pregnant with IVF and that the last steps the body needs to take naturally (implantation) actually occurred. With that knowledge, the patient will be reassured that this treatment can work, that her body can do what it needs to do, and it is just a matter of getting a perfect embryo into her womb for her to be successful. The majority of chemical pregnancies occur because the embryo is genetically abnormal. It would be good to know that those last steps, those steps that are beyond our technology, can occur on their own.

Post-Transfer Pains

The body is a fluid and dynamic structure and there will be many sensations that patients report during this period. Some will report many types of pain, some will have cramping, and some will have bleeding. Most of these symptoms are not of any consequence but cause patients to needlessly worry. Some doctors have referred to these “pains or cramping” as implantation related. That may be the case but no one knows for sure. Certainly with implantation, the uterus is undergoing changes and cramping tends to be one way that uteri react. So, if the timing is appropriate, namely at the point where implantation would be expected as described above, then these sensations could certainly be related to it. Of course, onset of one’s period can also be heralded by cramping, but this is usually accompanied by bleeding. If adequate hormone replacement is given in the luteal phase of the process, then the period should not start until the medications are stopped. That is the cause of the onset of the bleeding and cramping associated with a period; it is the withdrawal or abrupt drop in hormone levels. Some will claim that this is the uterus “stretching or growing,” but this could not be the case at this point in the pregnancy. The *embryo is like a mere fleck of dust* within the cavity and not big enough to cause the uterus to begin growing.

Some patients will experience sharp or stabbing pains, on the other hand, that may not be from implantation but more from the ovaries. About three days after the retrieval, the ovaries will refill with fluid and this stretching of the follicles and ovaries certainly can cause pain in one side or both sides. This is the pain sensation that most patients have during this period of time. If this pain becomes severe and not relieved with simple pain medication such as Motrin, Ibpuprofen, Naproxen or others, then it could be a serious problem. Post-IVF complications causing severe pain include ovarian hyperstimulation syndrome (OHSS), ovarian torsion (twisting), ovarian hemorrhage, ectopic pregnancy, and pelvic infection. If the pain is mild, then intervention is probably not required, but if severe, it could be one of these serious medical problems that will require medical treatment because they could be life threatening. You should know, however, that these complications are very rare. On the other hand, if you have had a positive pregnancy test and these symptoms occur, impending miscarriage could be another source of cramping or pain.

Bleeding After Embryo Transfer

Bleeding within this period is also a very common complaint. *It is the most common subject searched and commented on.* In most cases, this is a very light bleeding (pink or red) or spotting. Some will refer to this as "implantation bleeding," although, this may not explain all of the causes because the timing is often not right. Again, in most cases, this bleeding is inconsequential, but it could also indicate problems such as inadequate hormone support for the luteal phase, thereby causing the endometrial lining to start to slough. It could also indicate that the period is starting or that an abnormal pregnancy exists or is being miscarried. When the bleeding is light, no intervention is required. First, there is no intervention that can be done, other than checking hormone levels and increasing the progesterone if the level is inadequate. Second, this could be normal, if in fact it is implantation bleeding. Third, if vaginal progesterone is used, the progesterone may be causing the cervix to be more delicate or friable and therefore cause *cervical* bleeding.

One cause of light bleeding that does need medical attention is *when it occurs after the pregnancy has already been diagnosed*. This bleeding may be a sign of an ectopic pregnancy (pregnancy in the tubes, ovaries, or elsewhere, but not in the uterus). Your doctor needs to be made aware of this if you have already been diagnosed with a positive pregnancy test. In our experience, where we use vaginal progesterone on all patients, we see almost 90+ percent of them complain of some light bleeding.

The only worrisome bleeding is if the bleeding is heavy like a period or more. This could mean that the period is starting because no implantation occurred, or it could be an early miscarriage if it did. It can also occur in a multiple pregnancy, such as a twin, if one of the fetuses is lost. When we went through IVF over a decade ago, my wife also had heavy bleeding after our IVF cycle. It occurred at about eight weeks gestational age and was very heavy, with large clots. I was sure that she had lost the pregnancy but an ultrasound showed that the pregnancy was still there and viable. She went on to have a successful pregnancy and delivered a beautiful, normal, and smart daughter. I never did figure out what this bleeding was from. **So if bleeding occurs, it is not necessarily indicating the end of the pregnancy.** There are other medical causes of bleeding once the pregnancy is established, but that would be a totally different topic and is more pregnancy-related than IVF-related.

Bleeding and Spotting After Embryo Transfer

We have had many questions regarding bleeding right after embryo transfer or in the luteal phase. What follows is an attempt to answer one of the **chief** concerns that IVF patients have, namely, "What if I have bleeding after my embryo transfer?"

Answer:

The embryo transfer is the most crucial step in the in vitro fertilization procedure/process. You can have the best quality embryos, but if they are not placed into the uterus correctly, then pregnancy *will not occur*. That is why "transfer technique" is so important. There have been studies showing that pregnancy rates can vary by physicians *within the same group*, and this is all because of transfer technique. Once the disparities between transfer techniques were corrected and unified, the pregnancy rates became consistent. For this reason, you want to seek out a physician who has a lot of experience with embryo transfers and comparable good pregnancy rates. If you go to a clinic that has multiple doctors, ask for the pregnancy rates of each physician or your particular physician.

For more details regarding post embryo transfer bleeding, pain, and other symptoms, see "What to Expect After Your Embryo Transfer."

Bright Red Blood with the Embryo Transfer.

If blood contaminates the endometrial cavity at the time of the transfer, *this will kill the embryos* and pregnancy will not occur. The catheter must be placed as gently and atraumatically as possible. That is an absolute requirement. The endometrium, which is now in its fullest growth state, thickened from estrogen stimulation, can be easily scraped which will cause bleeding.

At our centers, we use very soft catheters, very gentle technique, ultrasound guidance, and mock embryo transfers preceding the cycle to accomplish this. The mock embryo transfer is especially important so that the physician is not learning the curves of your canal at the time of transfer but has worked it out prior. This is especially important in patients whom we consider to have a "tortuous" canal, making it more difficult to insert the catheter with care.

You should not worry if brown blood or discharge occurs at the time of transfer; it will usually manifest within the first day or so after the transfer, but not into the mid-luteal phase or later. That type of bleeding would be from a different source.

There are situations, however, when bleeding can occur but not be ominous. Sometimes a woman's cervix will bleed easily from being scraped by the speculum or irrigation or wiping. This external bleeding will not affect the endometrial cavity as long as the transfer catheter is not exposed to the blood.

Bleeding After the Transfer

Bleeding that occurs later in the luteal phase, days after the transfer, is very common if vaginal progesterone is used.

This has been shown in various studies using Crinone (progesterone vaginal gel), for example. When using both vaginal and injection progesterone, it is almost 90 percent possible, but the bleeding tends to occur near the time of the pregnancy test or soon thereafter. This is probably caused by some erosion occurring on the external cervix. The exact cause, however, is not clearly understood. It is usually light spotting and can be anywhere from red to brown. Red is newer blood and brown is old blood. In general, we tell our patients not to worry about this.

Bleeding that is red and heavy like a period is not a good sign and should not occur if the hormones progesterone and/or estrogen have not been discontinued. Some patients will experience slight spotting three to five days after embryo transfer and refer to this as "implantation bleeding." Whether or not this is caused by implantation is not known. Implantation should not cause bleeding.

Getting Through the Two-Week Wait

Commonly Asked Questions

For most patients who undergo fertility treatment, the two-week wait before you have your beta (pregnancy) test can seem like an eternity. Each day seems longer than the last, and the question "Am I pregnant?" goes through your mind hundreds of times a day. One becomes hyperaware of your body's every sensation. We all sympathize and wish there were some medical way to make the time shorter or easier for you. In an effort to ease some of the anxienty, we gathered some questions from our community, ran them by our nurse educators, and came up with some answers to your pressing two-week wait questions.

Q: What is the two-week wait?

A: The two-week wait is the period of time between the end of your fertility treatment cycle and beta hCG blood test – the test that determines whether or not you're pregnant. It takes about two weeks from the time a fertilized egg implants in the uterine wall to start emitting enough of the hormone hCG (human chorionic gonadotropin) to be detected by a blood test. We sometimes call the test a "beta" because the test actually measures a beta chain portion of the hCG hormone molecule and is officially named a "beta HCG test."

Q: Can I take a home pregnancy test to see if I'm pregnant?

A: We recommend that you refrain from performing a home pregnancy test as they can render false results, either a false negative or false positive. A false positive result may be due to the fact that in many of our treatments, hCG, the same hormone that measures pregnancy, is given to "trigger" ovulation in many of our patients. Traces of the administered hCG can still be in your bloodstream and detectable by a test, even if implantation has not occurred. A false negative might occur as a low level of hCG may be undetectable in a urine test, despite a pregnancy starting, as urine tests are less sensitive than the blood hormone tests we use.

On average, two weeks after your IUI or embryo transfer you will come back to our center for your pregnancy test. This test is done by blood draw and measures the hCG levels produced by the developing embryo. The most reliable pregnancy test is the blood test we perform in our offices.

Q: What is happening to my body during the two-week wait?

A: During this time, you may feel as if you are about to start your period. Your body has been through a lot and the medications you're taking are designed to promote the optimal environment for pregnancy. You may experience some cramping, spotting, or light bleeding, abdominal bloating, fatigue, and breast tenderness. While you may be slightly alarmed to experience some of these symptoms, they are normal and do not signify that you are or are not pregnant.

Please note, if after your treatment you feel excessive bloating, shortness of breath, chest pain, or lower abdominal pain, you may have ovarian hyperstimulation and should call your clinical team immediately.

Q: Will I be taking medications during this time?

A: Yes. Most patients need to continue to take progesterone supplements in order to produce the same levels of hormones that would occur in early stages of pregnancy.

While most patients will supplement their progesterone via pill or vaginal insert, patients who are using donor egg or frozen embryos will use the injectable form of progesterone for their cycles.

Additionally, patients who undergo IVF, donor egg, or frozen embryo transfers may also be prescribed estrogen supplements to help thicken and maintain the uterine lining.

Please do not stop taking these medications until you have been advised by the medical staff to do so.

Q: Can I continue my normal day-to-day activities during the two-week wait?

A: We tell all of our patients to be cautious during their first five days after their treatment. We recommend that you refrain from strenuous physical activities as well as sexual activities during that time as they may cause uterine contractions that might impair the implantation process. There is also a greater risk during that time of ovarian issues arising since, for many patients, the ovaries are still slightly enlarged at that point.

After those first few days, you can start to do light aerobic activities such as yoga, swimming, moderate walking and swimming, and lightweight training on a step machine or elliptical trainers – activities that can get your heart rate up, but are not demanding or heavily impact the body like jogging, impact aerobics, or treadmills.

Q: Do I need to adjust my diet during this time?

A: No special diet is required, but we recommend that you start making nutritional choices as if you're already pregnant. This means eating well-balanced meals, no sushi or other raw or undercooked meats, avoiding high-mercury fish and soft cheeses, no alcohol, and continuing to take prenatal vitamins.

Q: Can I travel during the two-week wait (or thereafter if pregnant)?

A: We prefer that patients avoid traveling for the first few days post-treatment, primarily so that you are close to our center for examination should any problems develop. This also is true during and following the time of your pregnancy testing and ultrasound. Early pregnancy complications such as hyperstimulation, bleeding, or pain can occur and we would want you near your team here for care. In addition, the rigors of travel, time zone changes, luggage, etc. leave you vulnerable to complications. Before you schedule travel during this period of time, check with your nurse and team to see if this is at all advisable.

Q: What levels of hCG will determine if I'm pregnant?

A: Any positive level of beta hCG above 5 mIu/ml indicates a pregnancy has started (unless the test is done too early following an HCG trigger injection). A blood hCG number over 100 is a good first beta result, but many, many ongoing pregnancies start out with a beta hCG level below that number. Higher numbers cannot predict a multiple pregnancy; only the ultrasound can determine that.

Additional beta tests will be performed every 48 hours after the first positive test to confirm the hCG level continue to rise. We look for the level of hCG to rise about 60 percent or more in each of the additional tests. If the number continues to increase, we're more confident that it's likely a viable pregnancy.

We will then have you come in for ultrasounds usually between six to seven weeks to determine if the embryo continues to develop into a fetus. At about eight plus weeks, our center will refer you back to your OB-GYN to continue your prenatal care.

Q: If I am pregnant, how do you "count" how far along we are?

A: As soon as it is determined that you are pregnant, we revert to the obstetrical counting / dating system. This is done to avoid using one set of dates from the time of an IUI or IVF versus another set of dates used by obstetricians. The OB doctors determine pregnancy dating to be from the last menstrual period, at least two weeks prior to ovulation. Obviously, we often know more about when ovulation may have occurred than usually they do, but for convention, we add two weeks to our dates to conform with the OB. As an example, if we know when ovulation was triggered and an IUI or IVF was performed, your beta might be two weeks thereafter. If it is positive, the OB would say you are FOUR weeks pregnant, not two, and therefore so do we.

Your first early pregnancy ultrasound is usually scheduled between six to seven weeks gestational age. That is actually only four to five weeks from your IUI or embryo transfer. You just saved two weeks off the length of a 40-week pregnancy!!

Q: What are my next steps if I'm not pregnant?

A: If you aren't successful, your nurse will advise you to stop your medications. You will have the opportunity to talk with your physician to review the past cycle and make a decision together about your next steps.

Q: How long after a failed cycle can I do another cycle?

A: While your physician will determine the timing of a new cycle, it's not always necessary to take time off between cycles unless otherwise directed. Many of our patients are able to begin their next treatment cycle immediately, and for many, a cycle of rest is recommended.

We know that these two weeks can be a very stressful time. If you're looking for ways to help pass the time, you can reach out and get support from patients who understand what you are going through. If you have any questions, please don't hesitate to call us.

All About the Beta hCG: Values, Facts, FAQs, and Other Information

Everything you're about to read about betas will make the subject as clear as mud. Beta hCG measurements should be viewed *only* as guidelines and estimates, and cannot be compared between one woman and another. Low numbers can be normal, high numbers can be normal, and perfectly normal numbers can fool everyone. Betas are like gremlins. You'd rather not have to deal with them and they totally wreck your life while they're around... yet, you want to know as much about them as possible.

Our strongest advice is this: once you have had two or three quantitative hCG tests and your doctor says everything is progressing well, take that as a positive sign and put your mental energy elsewhere. Betas are a special form of torture that only assisted reproductive technology patients get to endure – most women who get pregnant without help never even get a quantitative hCG test done; their doctors just test to see if there is any measurable pregnancy hormone in the bloodstream and then move on. For those women special enough to live in a world where quantitative hCG tests are important and nerve-wracking (*you*, we presume), here's everything you need to know that probably won't tell you what you want to know.

What is a Beta Test?

A beta test, also known as beta hCG (human chorionic gonadotropin), is a blood test that confirms pregnancy. A *qualitative hCG* simply reports whether or not there is hCG present in the bloodstream, while a *quantitative hCG* reports the level of hormone that is present.

What is hCG?

hCG is human chorionic gonadotropin, better known as "the pregnancy hormone." The body begins to produce hCG when an embryo begins to implant in a uterus, which is typically 8 to 10 days after conception.

My Doctor Told Me I'm Pregnant, But Didn't Give Me a Beta Number. What Does That Mean?

It may mean that your doctor ran a *qualitative* hCG test rather than a quantitative hCG test. Call your doctor's office, ask to speak to his/her nurse, and ask them if you have a *quantitative* hCG value. If you did not get this test done, request that they perform this test ASAP, and then again two days later. Then you'll have as much information as you can.

What Should My Quantitative Hcg Be?

There can be a tremendous variation in "normal" hCG levels. The following chart is what most textbooks consider to be normal; however, you must remember that this is only one measure of your pregnancy's progress!

Time from LMP	hCG (mIU/mL)
3 weeks	5 - 50
4 weeks	5 - 426
5 weeks	19 - 7340
6 weeks	1080 - 56,500
7 - 8 weeks	7650 - 229,000

How Do I Know Whether My Betas are Rising Normally?

Typically, betas will double in value every 48-72 hours. This means that if your beta is 150 on Monday, it should be around 300 between Wednesday and Thursday. Confusing? You bet. Just enough to make us all nutty.

My First Beta is Only 25. What Does That Mean?

There's no real way to tell, yet. The most important thing you need in order to answer this question is another test in 48 hours. Your doubling time will give you a much better indication of whether your pregnancy is progressing.

What are the Reasons My Beta May Be Low?

There are so many reasons that betas can start out "low" or "high."

- Depending on your procedure (if you had an IUI done, a cancelled cycle during which you had intercourse, or if you're pregnant using natural "rhythm" timing), you may not know your ovulation date. Without knowing your ovulation date or your date of transfer, you may not have your pregnancy test done at the right time.
- Another reason for a low beta is that some embryos are "late" implanters. Typically, an embryo begins to implant and your body begins to produce hCG between 8-10 days past conception. But it's possible your embryo had a slower start.
- Some research shows that frozen embryos are slower/later to implant than fresh embryos. So if you did a frozen embryo transfer (FET), this may be the case.
- Your number may be low because you had a chemical pregnancy. Sadly, this is a very early miscarriage. It is estimated that up to 25 percent of pregnancies end in early miscarriages, but researchers aren't sure. Most women who go through IVF know everything about their lab values, practically to the minute. But in the rest of the population, women can experience a chemical pregnancy without ever knowing it.
- Your number may just be low and there's no way to know why. Remember the range in that table above? There's a big range of acceptable values, and that means *someone* has to be at the low end. It could be you, and there is nothing unusual with your pregnancy. (I know of one woman whose first beta was 4. She has a three-year-old boy now.)

My Beta is Not Doubling Every 48-72 Hours. What Does This Mean?

For what it's worth, I hate the beta roller-coaster. This period of time in an IVF cycle is just the worst. I'm sorry you even have to read this!

Your embryo may be a slow starter. The doubling time is a guide, an estimate that doctors use to help gauge a pregnancy's early progress. But not everyone follows the rules. Sometimes a low doubling time in the beginning means nothing. Sometimes, it's bad news.

- A slow doubling time can mean your embryo is not viable. You've done everything you can do, and there is nothing you can do now but wait.
- Your embryo may just not make it, for whatever reason we won't know. Your embryo may have chromosomal abnormalities which keep it from being viable.
- Your pregnancy may be ectopic – outside of the uterus. An embryo can travel out of the uterus and up a fallopian tube, or even out into the abdominal cavity. Ectopics are rare, but they happen.
- You may have a blighted ovum. This is another type of miscarriage, in which the embryo attaches to the uterine wall but then ceases to develop. However, the cells continue to form the pregnancy sac, which is what is causing a slow rise in the hCG numbers.

My Beta Dropped from One of My First Measurements, But Then Started Going up Normally Again. What's Going On?

If your beta is continuing to double every 48-72 hours again, there is a great chance that everything is fine.

- One of the lab readings may have been an error.
- You may have had a *vanishing twin*. This happens when two embryos implant and start producing hCG, but then one of them dies. You start with "twice" the hCG, and then the number drops – but as the remaining embryo grows, your doubling time is back to normal again. Congrats on your singleton!

My Beta Dropped Really Quickly, and My Doctor Wants Me to Test Again in Two Days. Tell Me There's Hope.

There is absolutely always hope. If you hang out on some of the IVF community sites for long enough, I promise you'll hear every success story in the book. But a sharp drop in your beta hCG usually means that you are miscarrying. Keep hoping until your doctor tells you otherwise, because it is not always the case.

My Beta is Through the Roof! It's Higher Than Any of My Friends' Betas Have Been. What Does That Mean?

The beginning to each of these answers seems to be the same: you might just have an unusual number. But there are other reasons for a high beta.

- Multiples. Did you transfer two or more embryos?
- Spontaneous twins. Sometimes, the embryo splits and you get identical twins. Identical twins (one embryo, split) are not as typical in IVF as fraternal twins (two embryos), but it can happen.
- A molar pregnancy. (This is really unusual – don't even worry about this unless your doctor tells you to.)

When am I in the Clear? When Does the Beta Hell End?

Once a beta is somewhere between 1,000-2,000 mIU/mL, a gestational sac can usually be seen via transvaginal ultrasound. Once your doctor sees that sac, you're off of the beta roller coaster.

Your Pregnancy at 10 weeks

During Week 10 of your pregnancy, a fetus is starting to become recognizably human and develop the features they will have by the time of birth.

As with earlier weeks, Week 10 is a time of rapid growth and developmental strides. The first trimester lasts until 12 weeks, and the growth and development of the baby during this period become more and more complex.

In fact, during this time, the vocal cords are formed. If the fetus were not underwater, it would be able to make sounds very soon.

This provides a summary of each stage of pregnancy, what to expect, and insights into how your child is developing.

Symptoms

Symptoms of early pregnancy include nausea and fatigue.

At this stage, you may continue to experience physical pregnancy symptoms such as:

- fatigue
- nausea and vomiting
- cravings and food aversions
- heartburn and indigestion
- bloating, gas, constipation
- occasional headaches
- increase in vaginal discharge
- dizziness and faintness
- round ligament pain
- visible veins
- moodiness

While some women experience nausea, others will have intense cravings or dislikes for certain foods. Either way, it is important to eat a balanced and healthful diet.

If you find yourself eating strange things such as plant dirt or laundry starch, this is a condition called pica. Speak to your doctor about this.

Some symptoms such as dizziness and visible veins may be due in part to the increase in circulating blood flow.

The veins running across the breasts and abdomen may now be prominent. These can be cosmetically bothersome, but they are vital for carrying essential nutrients to your fetus.

Some women will experience round ligament pain due to stretching and pressure from the growing uterus, which is now about the size of a grapefruit. The pain can be sharp or dull. If it is severe, you should talk to a healthcare provider to rule out other causes.

It is worth noting that, during pregnancy, there is a higher risk of urinary tract infections (UTIs) from Weeks 6 to 24. If you suspect an infection, speak with your healthcare provider about treatment.

The Three Trimesters

Pregnancy has three trimesters, each of which is marked by specific fetal developments. A pregnancy is considered full-term at 40 weeks; infants delivered before the end of Week 37 are considered premature. Premature infants may have problems with their growth and development, as well as difficulties in breathing and digesting.

First Trimester (0 to 13 Weeks)

The first trimester is the most crucial to your baby's development. During this period, your baby's body structure and organ systems develop. Most miscarriages and birth defects occur during this period.

Your body also undergoes major changes during the first trimester. These changes often cause a variety of symptoms, including nausea, fatigue, breast tenderness, and frequent urination. Although these are common pregnancy symptoms, every woman has a different experience. For example, while some may experience an increased energy level during this period, others may feel very tired and emotional.

Second Trimester (14 to 26 Weeks)

The second trimester of pregnancy is often called the "golden period" because many of the unpleasant effects of early pregnancy disappear. During the second trimester, you're likely to experience decreased nausea, better sleep patterns, and an increased energy level. However, you may experience a whole new set of symptoms, such as back pain, abdominal pain, leg cramps, constipation, and heartburn.

Somewhere between 16 weeks and 20 weeks, you may feel your baby's first fluttering movements.

Third Trimester (27 to 40 Weeks)

You have now reached your final stretch of pregnancy and are probably very excited and anxious for the birth of your baby. Some of the physical symptoms you may experience during this period include shortness of breath, hemorrhoids, urinary incontinence, varicose veins, and sleeping problems. Many of these symptoms arise from the increase in the size of your uterus, which expands from approximately two ounces before pregnancy to two and a half pounds at the time of birth.

Chapter 6
Travel guide

Kyiv, Ukraine

General Information

It's incredibly easy to travel to Ukraine with an average flying time of just 2-3 hours from most European airports. Wein Austria 50min, Frankfurt Germany 2hrs, 30min, Berlin 2hrs 19min, Munich 2hrs 5min, CDG Paris 3hrs 5min

Distance from Boryspil International Airport (KBP) to center: Average 30 minutes driving time

EDU Fertility is in the heart of the city center of Kyiv and 7 to 10 minutes from most hotels and rental apartments we offer.

Local currency: Ukrainian Hryvnia (UAH) $1 = 36.65 UAH

Taxi fares around the city range in price from $3 to $5 one way.

Time Zone: New York +7 EDT / Los Angles + 10 PDT

Weather: January is the coldest month in Kyiv, with an average high temperature of 30.4°F and an average low temperature of 21.6°F. The summers are comfortable and partly cloudy. Over the course of the year, the temperature typically varies from 20°F to 78°F and is rarely below 1°F or above 88°F.

Overview

Kyiv, Ukraine (also referred to as Keiv) is the most underrated tourist destination in Europe. In recent years, there has been a steady increase in visitors, and the capital city of Kyiv is developing a tourist industry to rival anywhere else in Europe. Kyiv offers some big advantages over other European cities. Ukraine is not part of the EU and is much cheaper than almost every other country in Europe. In Kyiv you can enjoy the best restaurants, bars, nightclubs, and just about everything else on a reasonable budget. One of the most surprising things about Kyiv is the quality of the food and nightlife. You will never get bored in Kyiv; it is a fascinating city for sightseeing and entertainment.

Kyiv is the sixth-most populous city in Europe. It is a bustling capital of independent Ukraine, its administrative, economic, scientific, cultural, and educational center. This scenic city with a population of over four million people is located on the shores of the Dnepr River (1,368 miles long).

Kyiv is a city of invaluable historical and cultural monuments, a city of great events and outstanding people.

The art and architecture of Kyiv is considered a world treasure. Many famous artists, poets, and writers estimated the unique beauty of this city. The most renowned landmarks include Cathedral of St. Sophia with outstanding mosaics and frescoes dating back to the 11th century, Kyivo-Percherskaya Lavra featuring several monasteries and cathedrals, Golden Gate of Kyiv dating back to 1037, Ukrainian Baroque Church of St. Andrew, the magnificent 19th-century Cathedral of St. Vladimir, and many other attractions. Kyiv is often referred to as “the mother of all cities” by Ukrainians. It is one of the oldest cities in Europe. In the historical center of Kyiv, you can feel the spirit of the past everywhere.

Kyiv is distinguished for its rich cultural life. Theater lovers will find many theatres offering various theatrical programs. Most performances are held in Ukrainian or Russian. The recently renovated Kiev Opera House presents very good opera as well as a broad repertoire of ballets. Ivan Franko Theater is a center of Ukrainian drama, comedy, and musicals. Various exhibitions are carried out in the city’s numerous museums and art galleries.

Kyiv is also a scientific and educational center of independent Ukraine. Kyiv is home to various universities and science academies including the famous Kiev-Mogilyanskaya Academy, which is one of the first scientific establishments in Eastern Europe.

Being the largest city of Ukraine, Kyiv is a leading industrial and commercial center of the country. Kyiv’s major industries include food processing (especially processing of beet sugar), metallurgy, manufacturing of machinery, machine tools, rolling stock, chemicals, building materials, and textiles. The development of Ukrainian economy gave impulse to business activity of the city. There are a lot of new office centers, banks, trade exhibition centers, and other commercial enterprises appearing in the city nowadays.

Take a walk through the ancient streets of this scenic city, feel its unique beauty and the spirit of its past. For sure your stay in Kyiv will become one of your most memorable experiences.

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