

In Vitro Fertilization Program Guide

University of Iowa Health Care
Center for Advanced Reproductive Care



At UI Health Care a team of professionals are dedicated to providing excellent assisted reproductive services. The In Vitro Fertilization (IVF) Team welcomes you to our program. We hope your experience will be fulfilling.

Due to the sensitive nature of IVF and REI appointments and out of respect for other patients and their partners, we do not allow children at any visit. Appointments will be rescheduled if children are present.

This book will give you an overview of services to help you in decision-making and guide you through the treatment process.

Services offered are:

- Evaluation of the infertile patient
- Reversal of tubal sterilization
- Operative laparoscopy and hysteroscopy
- Ovulation induction
- Intrauterine insemination (IUI)
- IUI with Donor Sperm
- In Vitro Fertilization (IVF) and embryo transfer
- Assisted fertilization using intracytoplasmic sperm injection (ICSI)
- Sperm retrieval
- Embryo freezing (cryopreservation)
- Preimplantation genetic screening and diagnosis *
- Anonymous and known egg (oocyte) donation/recipient *
- Anonymous and known embryo donation/recipient *
- Intended parent/gestational carrier services *
- Fertility preservation
- Counseling services

*** More information about these services will be given upon request.**

To get your questions answered:

- Talk with your care team at appointments
- Call your clinic
 - North Dodge at 319-356-8483
 - Quad Cities at 563-355-2244
 - Jordan Creek at 515-336-6562
- Go to the website uihc.org/infertility

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Criteria for IVF

Before IVF is tried, the care team will ask:

1. Have simpler and less costly treatments been tried?
2. Is there a reasonable chance you will get pregnant?

The below criteria are used to decide if a person can start IVF.

Medical reasons:

- Tubal absence
- Endometriosis or tubal disease unresponsive to treatment
- Ovarian dysfunction
- Male factor infertility
- Unexplained infertility
- Recurrent pregnancy loss
- Selection of unaffected embryos to prevent a genetic disease
- Absence of uterus
- Other reasons that may lead a person to need a gestational carrier

A person must also meet:

- Age criteria
 - People using their own oocytes:
 - Have a better chance for pregnancy if they are less than 40 years of age.
 - May be accepted if they are 40 to 42 years of age with regular menstrual cycles. They must understand the chance of pregnancy and live birth is less with age. IVF must start at least 6 weeks before their 43rd birthday.
 - Is rarely used for people over the age of 43. People age 43 and 44 must meet certain criteria to qualify.
 - People using donor oocytes:
 - Eggs from an anonymous or known donor may be used up to a person's 50th birthday.
 - People using frozen embryos:
 - These must be used by the carrying person's 50th birthday.
 - People using a gestational carrier:
 - Single parents must be less than 55 years of age.
 - One person of a parent couple must be less than 55 years of age.
 - Embryos must be made using at least 1 of the parents' gametes (egg(s)/sperm).

- All people using donor gametes or a gestational carrier will be seen by the program's health psychologist or another approved health psychologist. They must have counseling before treatment. Psychological concerns may deny or delay IVF. See the Psychosocial Issues section.

- **Psychosocial issues**

Your care team will care for your health and mental stability as best they can during fertility treatment. Certain psychosocial issues may have a poor effect on treatment planning, pregnancy, and parenthood, such as:

- Untreated or inadequately treated mental health. People with or showing signs of severe psychiatric conditions must be treated.
- Current suicidal or homicidal thoughts.
- Current use of psychiatric (or other) medicines that may cause harm during pregnancy.
- Untreated or inadequately treated substance use, abuse, or dependence, both past and present. No person with current alcohol, narcotic, or illicit drug abuse can start IVF. They must finish an approved substance abuse program. Random drug screening may be needed if a person has a history. The IVF cycle will be stopped if a person has a positive drug screen.
- People who smoke have poorer stimulation and a lower live birth rate. People who smoke will be asked to quit. They should go to a smoking cessation program. A provider may order NicoDerm patches or Zyban.
- Lack of agreement or conflict between partners about the treatment plan. Couples with signs of a severely dysfunctional, unstable, or abusive relationship must do approved couple and individual therapy.
- Not preparing for the stresses of treatment, pregnancy, and parenthood. This could be due to current or predicted stressors, lack of physical and emotional support, or not understanding treatment. All people who start IVF must be able to give informed consent.
- Past founded reports of child neglect or abuse, or other criminal behavior. IVF may not be started if a person will not be able to provide safe care.

Evidence of any of the above does not mean a person cannot do IVF. It only means the issue(s) will need to be addressed before starting. The program health psychologist will work with people to make a treatment plan.

- **Physical health**

Good general physical health is needed. A person cannot have serious, untreated chronic illness.

- **Weight restriction.** This is to be sure a person has a healthy IVF cycle and pregnancy. A person's body mass index (BMI) must be below 50 before a cycle can start. An infertility evaluation can still be done if a person's BMI is greater than 50. The care team can talk with you about ways to lower BMI also. Go to nhlbisupport.com/bmi/ to learn more.

Having a BMI over 50 can:

- Lead to higher cancellation rates
- Lessen stimulation of the ovaries (fewer follicles stimulated)
- Limit the care team when retrieving eggs because of poor access to the ovaries
- Cause serious risks when intravenous (IV) sedation is used, such as trouble breathing
- Breathing issues can cause problems during egg retrieval
- Lead to a high-risk pregnancy

Access to the ovaries will be assessed at the 1st visit. Weight loss may be needed before doing an IVF cycle if the ovary(ies) cannot be seen.

- **Hemoglobin A₁C.** Diabetes can affect fertility. It can also complicate a pregnancy. If a hemoglobin A₁c is needed, it will be ordered. The hemoglobin A₁C must be less than 6.5 before starting IVF.
- **Sexually transmitted infection (STI) screening.** Blood tests for HIV, Hepatitis B surface antigen (**Note: This is antigen, not antibody.**), and Hepatitis C antibody are needed. Blood tests are needed within the past 5 years or if your partner has changed.

These may be ordered by your primary care provider. The results may be mailed, faxed, or hand carried to your 1st appointment. This testing can also be done at UI Health Care the day of your 1st appointment.

- **Other testing (childbearing partner only).** You must have a:
 - Blood test of immunity to Rubella
 - Blood test of immunity to Varicella, unless you had the varicella vaccine or chicken pox
 - Blood type
 - TSH (thyroid stimulating hormone) blood test within the last 3 years

Keep going to your primary care provider for your yearly exam, and to get your:

- Breast exam
- Mammogram if 40 years and older
- Pap smear (as recommended by your provider)

The First Appointment

Your first visit will be scheduled after the IVF team receives the needed information. **This visit may take hours. Both partners must be there.**

At your first visit:

- The care team will review your infertility records.
- Our health psychologists will meet with you and your partner if you will be using donated eggs, sperm, or embryos. They can also meet with any person who wants to explore emotional issues or have professional support during treatment. Let the care team know if you want to meet with the health psychologist. This needs to be scheduled before your visit. If you are seen at the Quad Cities or Jordan Creek clinic, this appointment will be scheduled at a later date.
- You will meet with an IVF nurse. They will talk with you about the IVF process.
- You will meet with the IVF financial counselor. They will talk with you about fee schedules, insurance, and payments.
- The first evaluation of people using their own eggs or donated eggs or embryos may include:
 - A health history and physical exam
 - Uterine sounding (measurement of the uterine cavity)
 - Blood tests if needed (and not done before visit) for STI's, thyroid hormone screening, blood type, and immunity to Rubella and Varicella
 - Pelvic ultrasound
- The partner providing sperm will be scheduled in the Andrology Lab. Read the "Evaluation of the Person Providing Sperm" section to learn more.

Testing often does **not** need to be repeated if already done. Ask to have those records faxed to us before your visit. If more testing is needed, the care team will talk with you at this visit or send a letter.

After testing and other treatments are done, the care team will tell you when IVF can be started. If no testing is needed, you may be scheduled to start medicines for your first IVF cycle within 1 to 3 months.

Scheduling of donor egg cycles will depend upon donor availability for fresh eggs or shipment of cryopreserved eggs.

Andrology Lab

The Andrology and IVF labs do:

- Diagnostic andrology
- Semen processing for intrauterine and in vitro insemination
- Lab procedures associated with IVF

The lab has been accredited by the College of American Pathologists since 1995.

Evaluation of the Person Providing Sperm

For the best outcome, the care team needs to find and, when possible, treat semen and sperm factors that may lower fertility potential. The andrology lab and a male infertility specialist in the Department of Urology assess male infertility.

Tests needed for the partner providing sperm are:

- At least 1 semen fluid analysis (SFA)
- Sperm morphology evaluation
- Sperm freezing (cryopreservation)
 - This is not needed for most people. However, it must be done for male factor infertility and enrollment in the IOWarranty program.

The SFA and morphology may be done at the North Dodge Andrology Lab or a local lab approved by UI Health Care Andrology Lab. If done at your local lab, a slide must be made for sperm morphology and sent to the UI Health Care lab.

Semen cryopreservation must be done at the North Dodge Andrology Lab. STI test results must be reviewed by IVF clinic staff before semen cryopreservation. STI testing can be done on the day of your 1st appointment. These results will be back in a few hours. Then semen cryopreservation can be done the same day.

An appointment in the UI Health Care Andrology Lab will be scheduled during your 1st appointment in the IVF clinic. **Tell the care team if you are being seen at the Quad Cities or Jordan Creek clinics.** You will be scheduled for SFA, sperm morphology evaluation, and semen cryopreservation, if needed. Before the appointment you must:

- Maximize the number and quality of sperm. **Do not ejaculate for 2 to 7 days before any semen collection.** Do not go longer than 7 days. This may lead to a higher number of dead sperm in the semen. This lessens the quality of the sample.
- Show a photo ID card when you check in at the andrology lab.

The IVF team may refer the partner to be seen by a male infertility specialist in the Department of Urology if any of the tests are not normal. Diagnosis and treatment of the factor(s) causing the reduced sperm quantity and quality may make your chance of conception better.

SFA appointments can be scheduled with the Andrology Lab by calling 319-467-5299.

Explanation of tests

- **SFA.** This tells the care team ejaculate volume, sperm count, sperm motility, sperm speed, seminal fluid viscosity, and other semen plasma parameters.
 - Viscosity is a measure of how fluid the semen is, 30 minutes after ejaculation. Special lab procedures must be used when preparing sperm when semen has an abnormal viscosity.
 - Sperm speed is a measure of how quickly and vigorously the sperm are moving. Slower moving sperm have a lesser ability to fertilize an egg than sperm that are moving at a rapid rate.

The normal range of parameters evaluated during SFA are:

Parameter	Normal Range*
Days of Continence (DC)**	2 to 7 days optimal
Volume	≥ 1.5 ml
pH of seminal fluid	≥ 7.2
Motile sperm/ejaculate ($\times 10^6$) ***	≥ 9
Sperm/ejaculate ($\times 10^6$)	≥ 39
Motile sperm/ml ($\times 10^6$)	≥ 6
Sperm/ml ($\times 10^6$)	≥ 15
% Motile	$\geq 40\%$
Speed	3 or 4 (active)
Viscosity	4 (low)
Agglutination	4 (<5%)
Post ejaculate urine	For lab use only unless noted in comments.

* 2010 WHO Laboratory Manual for the Examination of Human Semen-Cervical Mucus Interaction (Fifth Edition).

** Days of Abstinence

*** $10^6 = 1,000,000$

- **Morphology.** This is done to assess sperm head shape, sperm tail defects, and the percentage of sperm that appear to have normal morphology.
- **Post-ejaculate urine analysis.** This looks for sperm in the urine after ejaculation. A person may have retrograde ejaculation if there are many sperm in the urine. This means sperm are released into the bladder. Sperm can be taken from the urine used for IVF.
- **Semen cryopreservation.** Semen is frozen, if needed or wanted, before the IVF cycle. Then sperm will be available for oocyte insemination on the day of retrieval.

Semen collection for testing or procedures

- **Specimen containers.** Semen samples must be collected into a non-toxic, sterile container. It will be given to you in the Andrology Lab. **Do not** try to collect semen in any other container. This may result in low sperm survival.
- **Sample collection facilities.** Semen must be given to the Andrology Lab within 10 minutes after it is collected. So, the semen must be collected at the North Dodge lab. A room in a private place is used. Your partner may be with you. Sperm collected after anal, oral, or vaginal sex with the withdrawal method before ejaculation cannot be used.
- **Sample Collection Method.**
 - Masturbation with or without the use of lubricants is the best and preferred method. All people are strongly encouraged to use this. It prevents contamination and provides the most viable sperm population.
 - The lab has a non-toxic lubricant in the room. This is the only lubricant that can be used. Any other lubricants, such as Vaseline, K-Y Jelly, water, or saliva, should not be used. It will kill some or all the sperm.
 - People who cannot collect a sample by masturbation can use nonpermicidal condoms and collect using intercourse. This should only be used as a last resort. The risk of contamination and loss is very high.

After Acceptance into the Program

Use the time of waiting for your IVF cycle to become as healthy as you can be. Being mentally and physically ready for a possible pregnancy will give you a better chance for a good outcome.

- To prevent certain birth defects, all people trying to get pregnant should take the B vitamin folic acid daily. The normal dose is 0.4 mg. This is often the dose in multi-vitamin tablets.
- Both partners should stop:
 - Drinking large amounts of alcohol
 - Using recreational and nonprescription drugs
 - Smoking
 - Smoking lowers the number of eggs you will make. It cuts your chance of success in half.
- Work toward your ideal body weight.

Subcutaneous (SQ) and intramuscular (IM) shots are needed daily. They should be done in the late afternoon or evening during the cycle. Staff will teach you, your partner, and others who want to learn at the start of a cycle.

Many aspects of care can be done close to your home. The IVF team will work with you to coordinate local care when possible.

In most cases people are asked to start an IVF cycle in Iowa City, Quad Cities, or Jordan Creek. This is the point when:

- Cycle medicines are started
- Medication teaching is done
- A vaginal ultrasound is done
- The partner does sperm testing if needed

Allow 2 to 3 hours to learn about the medicines.

Blood tests may be done at the below UI Health Care labs:

- North Dodge
- Main hospital
- Iowa River Landing in Coralville
- Jordan Creek IVF clinic

You will need to talk with the IVF Clinic often during cycle stimulation. You will need an answering machine or cell phone with voice mail. The care team recommends setting up your MyChart account for communication as well.

IVF Overview

Treatment cycle confirmation

After your 1st visit, you will get a letter from one of the IVF providers. It will have your treatment plan. It will also list other testing that is needed before your IVF cycle starts.

Ovarian stimulation and monitoring

- **Stimulation**
 - Shots of fertility medicine(s) that mimic the body's natural hormones are given daily. This is done in hopes that 3 or more eggs will develop during the cycle. Most of the time, the more eggs fertilized, the better the chance for pregnancy. Fertility medicines often given are:
 - Follicle Stimulating Hormone (FSH), such as Follistim[®] and Gonal-F[®]
 - human Menopausal Gonadotropins (hMG), such as Menopur[®]
 - hCG (human Chorionic Gonadotropin, chorionic gonadotropin), such as Pregnyl[®], Novarel[®], or Ovidrel[®]
 - Leuprolide (leuprolide acetate, Lupron[®])
 - Ganirelix Acetate[®] or Cetrotide[®] (May be used instead of leuprolide.)
 - There are multiple stimulation protocols. The care team will decide which is best for you. They will talk with you at your 1st visit. Then they will give you more details at your cycle start visit.
 - You will take oral contraceptive pills (OCP's) before starting the shots with some protocols.
 - You will need a baseline transvaginal ultrasound with all protocols. Then you will need 1 to 4 more ultrasounds. This is based on your protocol and response to the shots, during your ovarian stimulation.
 - You will need SQ and IM shots. These will change based on the protocol and how your ovaries respond to the medicines. You may have as few as 8 (shortest protocol) to 21 or more (longest protocol) days of SQ shots before oocyte retrieval.

- When you have at least 2 retrievable follicles with an average diameter of 18 mm (or larger), you will take a shot(s) in the evening. It must be done 36 hours before oocyte retrieval. It starts the final maturation of the eggs, so they are ready for retrieval. Retrieval must be done before the eggs release (ovulation) from the follicles.
- **Monitoring.** Careful monitoring helps control and optimize ovarian stimulation. Your progress will be monitored with blood hormone monitoring and vaginal ultrasound.
 - **Blood Hormone Monitoring.** Blood may or may not be drawn in the morning on several days to follow estradiol (estrogen) levels. This is based on your protocol.
 - Local labs can be used for this test. The results must be sent by fax to IVF staff by 1 p.m. on the same day the blood is drawn.
 - **Ultrasound Monitoring.** During stimulation you will have ultrasounds of your ovaries.
 - High-frequency sound waves can be bounced off body tissues to show a picture on a monitor. The sound waves cannot be heard or felt.
 - The pictures show ovarian follicles. Then the care team can see the number, size, and place of the follicles.
 - While you are lying on your back an ultrasound transducer is placed in the vagina. You will be able to watch the picture of your ovarian follicles on the screen.

Ultrasound guided egg retrieval

- **Before egg retrieval (2 to 3 days)**
 - The care team will give you a book and talk about retrieval.
 - The doctor will review your history and get your informed consent.
 - Fresh semen collection is scheduled at the time of egg retrieval, unless using donor sperm or planned frozen sperm. If a sperm sample was frozen for back up, it can be thawed and used to inseminate the eggs, if needed.
- **During the procedure**
 - Ultrasound is used to help move a special needle through the back of the vagina and into ovarian follicles.
 - The eggs are drawn out of the follicles with gentle suction.
 - IV medicine is used for sedation and comfort.
 - It takes less than an hour.
- **After egg retrieval**
 - You will be given information about the number and maturity of eggs retrieved.
 - After you recover, you can leave the recovery area with an adult's assistance. Recovery time for ultrasound guided oocyte retrieval is often 1 to 2 hours.

IDing and handling of sperm, oocytes, and embryos

Many steps are used to be sure the identity of your sperm, oocytes, and embryos are maintained through the IVF process. Knowing which specimen belongs to you is our highest priority. Specimens are labeled with 2 identifiers throughout processing, culture, cryopreservation, and transfer.

IVF Procedure

Oocyte identification

- You will check in at the procedure suite. Staff will ask you your name and date of birth. Then they will put a wrist band on you. This must stay on your wrist the whole time.
- Staff will do a “time out” before the oocyte retrieval. Your name, date of birth, and the procedure will be reviewed with you. This is done by the doctor(s), nurse, and certified nurse anesthetist.
- The nurse will give the IVF lab a copy of your consent for IVF. The embryologist for the oocyte retrieval will review and document the consent review on your lab worksheet.
- The nurse will tell the embryologist your name again, right before the first tube of follicular fluid is handed to the lab.
- The lab will give you a report of the number of oocytes retrieved. The doctor will talk with you about it.

Sperm identification

- Andrology staff will need your partner’s ID if they are providing a semen sample the day of oocyte retrieval. Photo ID is best. It will be matched to the IVF requisition received from the clinic.
- A specimen container and lid will be labeled with the partner’s name, date of birth, and medical record. After the sample is collected, your partner will sign a statement that they gave the sample.
- Each test tube used for sperm preparation for IVF is labeled with the unique colored tape, the IVF case number, and the partner’s name. If donor sperm is used, it is labeled with the patient’s name. Sperm preparation is done by 1 technologist. Only 1 specimen is in a processing hood or centrifuge at a time.
- The inseminate ID, lab worksheet, and IVF requisition will be reviewed by the embryologist. Then they will sign the inseminate out of the andrology lab and take it to the IVF lab.

Insemination

At the time of insemination, the embryologist doing it will crossmatch your:

- Name and case number on the IVF requisition
- IVF lab worksheet
- Inseminate tube
- Incubator location
- Petri dishes with the oocytes

The ID on the inseminate tube will be confirmed by 2 staff before insemination.

Embryo culture

The case number and patient's last name are on the incubator location label. They are also etched on the bottom of each petri dish the embryos are cultured in. The ID of the embryologist doing the daily embryo observation and the time of the observation are on the IVF laboratory worksheet.

Embryo transfer

- You will check in at the procedure suite. Staff will ask your name and date of birth. A wrist band will be placed. It must stay on for the whole stay.
- A consent will be reviewed and signed before the transfer.
- The care team, a nurse and doctor(s), will take a time out before the transfer. They will confirm your ID and the procedure.
- When the doctor is ready, they will say your name and the number of embryos to be transferred. The embryologist will take the embryo(s) from the incubator. They will be sure the name the doctor says is the name on the incubator location and label on the petri dish with the embryo(s) chosen for transfer.
- The embryo(s) are loaded into the transfer catheter. The embryologist will say your last name and the number of embryos being transferred as they hand the catheter to the doctor.

Embryo cryopreservation

- Embryos that are cryopreserved are put in 1 of the lab's liquid nitrogen storage tanks. Each place in the tank has a unique identifier that results from 4 location codes. The identifier, IVF case number, and your last name are on each straw used for cryopreservation.
- The cryopreservation record has the:
 - Location description
 - Your name, medical record number, and date of birth
 - IVF case number
 - Straw numbers
 - Number of embryos in each straw,
 - Date and embryo stage of cryopreservation
 - Name of embryologist doing the cryopreservation
- After cryopreservation, the information on the straws is crossed matched with the cryopreservation record before being placed in permanent storage.
- A similar process is followed when the embryos are thawed.
- Embryos may be cryopreserved as late as embryo culture day 6. The lab will send you a MyChart message with a final embryo report.

IVF Lab Procedure

Oocyte recovery

After fluid is removed from the follicles, an embryologist looks for oocytes in the fluid under a microscope. When an oocyte is found, it is picked up in a very small amount of fluid, washed, and placed in the incubator. Oocytes are often found in 75 out of 100 of the follicles over the size of 10 mm. About 80 out of 100 oocytes will have finished maturation by the time the lab does insemination. The example below is based on our program's average oocyte recovery, maturity, and fertilization rate. This can change from person-to-person and cycle-to-cycle.

Oocyte recovery and fertilization rate:

16 follicles over 10 mm	x	75% recovered	=	12 oocytes
12 oocytes recovered	x	80% mature	=	10 mature oocytes
10 mature oocytes	x	70% fertilize	=	7 embryos

16 follicles over 10 mm	X	75% recovered	=	12 oocytes
12 oocytes recovered	X	80% mature	=	10 mature oocytes
10 mature oocytes	X	70% fertilize	=	7 embryos

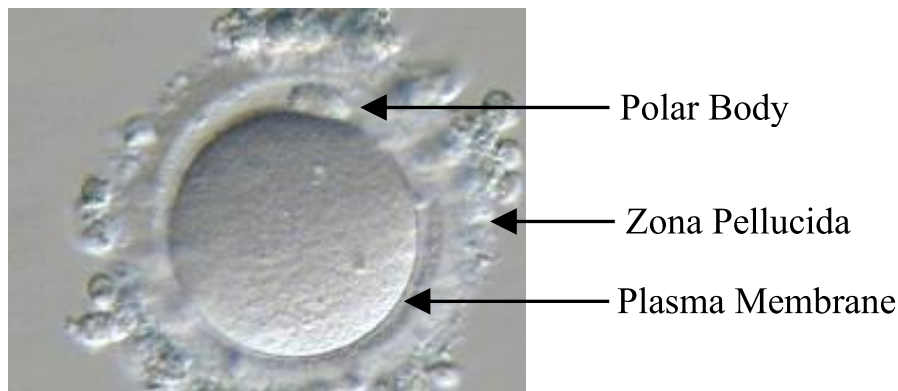


Figure 1. The mature oocyte. The oocyte has 2 surfaces that must be penetrated by sperm. The 1st is the zona pellucida. The zona pellucida protects the oocyte and stops extra sperm from getting in the oocyte after one sperm has penetrated it. The plasma membrane is the 2nd surface. The polar body is extra genetic material the oocyte sheds before fertilization. A polar body is a sign of oocyte maturity. A 2nd polar body is shed after fertilization.

Insemination

Oocytes are inseminated using conventional in vitro insemination techniques or intracytoplasmic sperm injection (ICSI).

- Conventional (routine) in vitro insemination is the incubation of the oocytes and sperm overnight.
- ICSI injects a single, live sperm into a mature oocyte. ICSI is needed for couples who have no or very low rates of fertilization during other cycles. It may also be needed when the number of normal motile sperm is less than that required for routine IVF. The care team will talk with you more about ICSI if it is needed.

Oocytes are inseminated about 5 hours after retrieval. After insemination, they are left undisturbed in the incubator for 12 to 18 hours. The 5-hours between retrieval and insemination mimic the time needed for the sperm and oocyte to travel and meet in the fallopian tube after intercourse and ovulation. No matter the insemination method used, about 70 out of 100 mature eggs will have normal fertilization.

Confirmation of fertilization

The oocytes are checked for signs of fertilization 12 to 18 hours after insemination. A normally fertilized oocyte will have 2 large structures inside the egg called pronuclei (each structure termed a pronucleus).

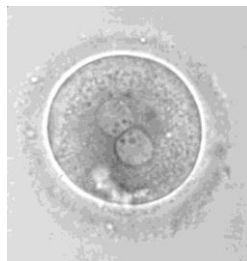


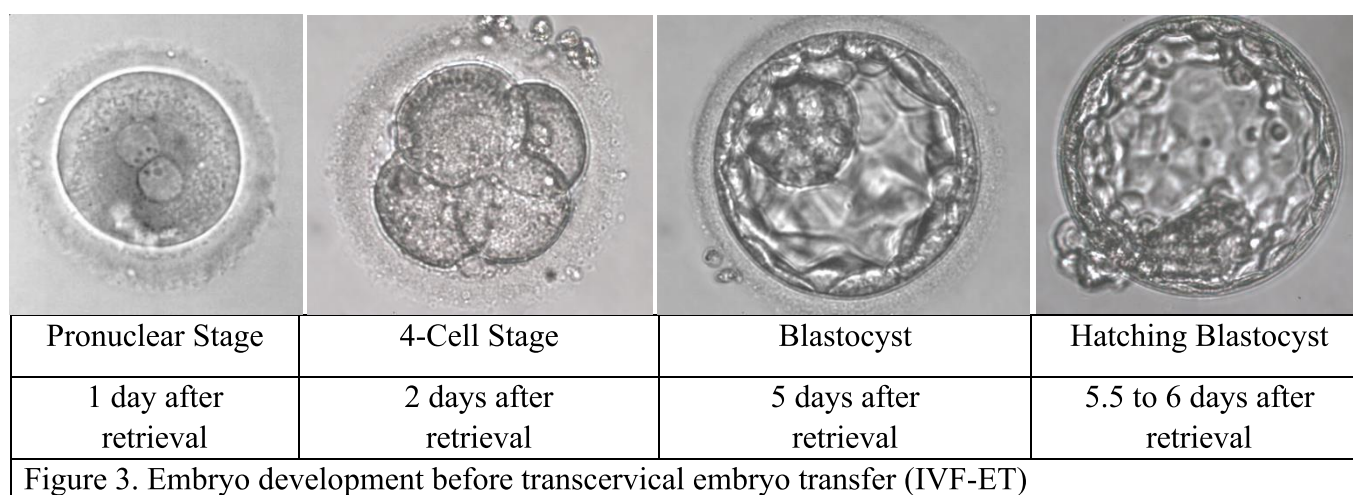
Figure 2. A normally fertilized oocyte. It is also known as a pronuclear stage embryo or zygote. The 2 structures in the middle of the oocyte are called pronuclei. One pronucleus has the genetic material from the male partner's sperm. The other pronucleus has the genetic material from the oocyte.

Embryo culture

IVF and embryo culture involve making the conditions in the lab as close as possible to those in the female reproductive tract. Embryologists in the lab control the:

- Nutrients
- Acidity
- Humidity
- Temperature
- Gas composition of air
- Exposure to light

Embryos are transferred on day 5 after retrieval (blastocyst stage).



Transfer day decisions and embryo selection criteria

The goal of IVF and embryo culture is to transfer high quality embryos that can develop normally and result in live births. Optimal culture conditions and reliable embryo selection criteria are needed to choose embryo(s) with the highest chance of leading to a pregnancy.

At UI Health care, about 25 out of 100 pronuclear stage embryos will develop into good or excellent quality blastocysts by day 5 post-retrieval (see figure 3). Embryo selection is based on the rate of embryo development and embryo morphology (how it looks).

Other Potential Laboratory Procedures

Preimplantation genetic testing (PGT)

PGT for genetic disease (PGT-M) can be used to find if embryos from IVF carry the gene for genetic disease, such as cystic fibrosis and muscular dystrophy. It may also be used to find if the embryo has chromosome abnormalities.

This can be done before embryos are transferred to the uterus. It is offered to people who have a high risk of having a child with a severe genetic disease or chromosomal disorder. The care team will talk with you more about this.

Embryo cryopreservation (freezing)

Blastocyst stage embryos can be frozen. Blastocyst stage embryos, of good quality, can be preserved through cryopreservation. They are stored for future transfers. Genetic and fetal abnormalities risks are the same with frozen and fresh embryos. The cost of a frozen transfer is much less than repeating a fresh embryo cycle and transfer.

The embryo cryopreservation fee includes the cost of 2 years of embryo storage. After 2 years, you will be charged for storage.

Estrogen tablets and progesterone shots are used before a standard frozen transfer. The goal is to transfer to a uterus synchronized with the age of the embryos. The date of transfer is decided by the IVF nursing team.

About 90 out of 100 embryos cryopreserved at the blastocyst stage survive freezing and thawing. The transfer of frozen embryos is the same as for fresh.

Embryo Transfer

Number of embryos to transfer

The care team tries to lower the risk of multi-fetal pregnancy while having high pregnancy rates each cycle. The goal is 1 healthy baby at a time. So, the care team has an embryo culture and transfer strategy:

Upper Limits for Number of Embryos to Transfer		
	Fresh Transfer	Frozen Transfer
Age of person (or oocyte donor)	Day 5	Day 5
37 and less	1 or 2*	1 or 2**
38 and above	2	2

*Only 1 embryo will be transferred if inclusion criteria met for blastocyst (day 5) single embryo transfer.

Inclusion criteria for single blastocyst embryo transfer (1 embryo will be placed):

- The oocyte provider must be 37 years of age or younger at the time of retrieval.
- You have at least 1 embryo rated as good or excellent on day 5 of culture. If there is not at least 1 good embryo, then 1 or 2 embryos may be transferred.
- You have not had a failed fresh IVF cycle (oocyte retrieval and embryo transfer) with the same oocyte provider at UI Health Care.

Inclusion criteria for frozen single blastocyst transfer (1 embryo will be placed):

- People who delivered after a single blastocyst transfer in the fresh cycle and have had no failed cryopreservation transfers will have a 1 blastocyst transfer if the embryo is good or excellent.
- The intended parent(s) did not have a transfer in the fresh cycle and the embryos were cryopreserved. Also, have not had failed transfers at UI Health Care.
- The intended parent(s) have at least 1 euploid blastocyst (normal embryo by PGT-A testing).
- A times the team may only allow transfer of 1 embryo after a failed transfer. This lowers the chance of a multiple gestation pregnancy.

- Criteria for transferring 2 blastocysts (if wanted):
 - The oocyte provider is 38 years of age or older. Then the intended parent(s) may choose to transfer 1 or 2 embryos.
 - The oocyte provider had an unsuccessful fresh IVF cycle (oocyte retrieval and embryo transfer) at UI Health Care. Then the intended parent(s) may be eligible to transfer 1 or 2 embryos no matter the grading. Your provider will talk with you about this before an embryo transfer.
 - The oocyte providers of any age have no embryos rated as good or excellent on culture Day 5. Then intended parent(s) can transfer 1 or 2 embryos. The care team recommends 2 be transferred for higher chance of pregnancy.

The procedure

Steps in the transcervical transfer are:

1. You lay on your back with knees bent and resting on leg supports.
2. A speculum is placed in the vagina so the cervix can be seen and cleaned.
3. Embryo(s) and a little culture media are drawn into a transfer catheter.
4. The transfer catheter is threaded through the cervical canal into the uterus. The embryo(s) are deposited. This is done under ultrasound guidance.
5. You sit up, dress, and go home.

After transfer

- In most cases, you may leave Iowa City after transfer.
- You have no activity or lifting restrictions unless told differently. The care team recommends you only do light activity the day of transfer.
- You start daily medicines as instructed. Keep taking them until pregnancy test results are known. Based on your protocol and lab results on pregnancy test day, these medicines may be taken until 8 or 10 weeks of pregnancy.
- About 10 days after embryo transfer a pregnancy test is done. This is a blood test for hormone levels. It can be done at UI Health Care or your local lab.

Thank you again for your interest in our program. Please write down any questions you have. Talk about them with your care team at your visit.