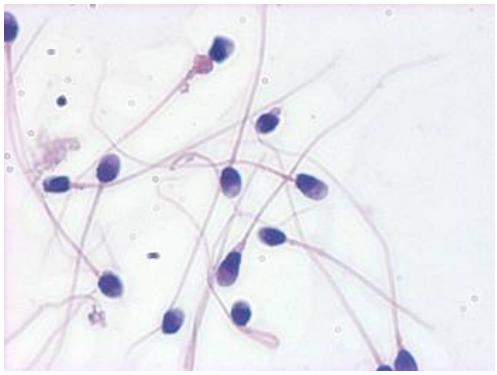
DIAGNOSTIC TESTING

Diagnostic testing include semen analysis, sperm penetration assay testing (SPA), testing for the presence of anti-sperm antibodies, testing for reproductive hormones, post vasectomy checks, semen cultures, and biochemical tests. Other diagnostic services include mucus-sperm interaction testing, evaluation of sperm and embryo chromosome aneuploidy.

Generally, the semen analysis is the "starting point" in the evaluation of male infertility, may indicate the possible cause of decrease fertility. The sperm penetration assay is particularly helpful in evaluating possible treatment options. Some of our more common tests are listed below:

- Semen Analysis
- Sperm Penetration Assay (Hamster Egg Penetration Test)
- Anti-sperm Antibody Test
- Retrograde Analysis
- Hormone Evaluation
- Post Vasectomy Analysis

Semen Analysis



The most efficient and economical method of evaluating male fertility is the semen analysis because it costs less than female infertility tests. It may also provide so much insight that it is recommended as the first step in attempting to obtain information that could lead to an accurate diagnosis. For regulatory purposes there must be a written physician's order before obtaining a semen analysis in our laboratory. After our staff receives the order a semen analysis may be scheduled by calling 612-863-4115 and requesting a laboratory appointment.

To obtain accurate test results it will be necessary to abstain from sexual activity for two to five days before the appointment because a shorter period of abstinence may affect sperm concentration while a longer period may diminish sperm motility.

The evaluation of the sperm includes sperm concentration, progressively motile sperm count, and sperm morphology (shape). Decreases in sperm concentration and sperm motility affect the motile sperm count, which reflects the ability to get a high enough concentration of sperm to the egg site to complete fertilization. Sperm morphology is important because it too reflects upon the ability of the sperm to fertilize an egg. A normal semen sample may consist of 60 percent normal, correctly shaped sperm and the remaining 40 percent may be abnormally shaped or abnormal sperm. A smaller percentage of normal sperm could result in reduced fertility.

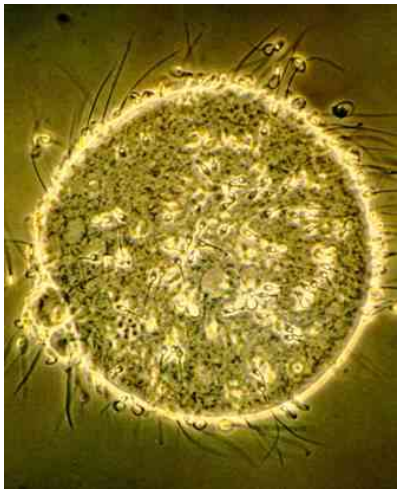
Sperm viability or the percentage of viable sperm may be tested using the Hypoosomatic solution assay. This test examines the sperm's plasma membrane and its ability to function, which may indicate its fertility. The seminal fluid's viscosity is evaluated in relation to sperm motility. Sperm agglutination or the tendency for the sperm to stick together may indicate the presence of anti-sperm antibodies. It is normal for the seminal fluid to have a small number of white blood cells,

but an increased presence of these cells may indicate an infection or prostatitis (inflammation of the prostate). If the white blood cell count necessitates a semen culture, a diagnosis and treatment for the problem may be found. If no sperm are found in the seminal fluid, an evaluation of fructose will be performed. A lack of fructose may indicate a blockage of the vas deferens, which secretes fructose and carriers the sperm from the epididymis to the prostate gland. There may be other problems such as a varicocele.

Sperm Penetration Assay (Hamster Egg Penetration Test)

The use of the sperm penetration assay (SPA) as a measure of fertility is based on the theory that fertile sperm samples will penetrate most hamster ova and thereby approximate penetration in vivo. Removal of the zona pellucida on hamster oocytes will allow penetration by human sperm in vitro. For penetration to occur, the sperm must be able to undergo capacitation, the acrosome reaction, oolemma fusion, and incorporation into the ooplasm. Poor sperm motility, low sperm count and abnormal head morphology may affect sperm penetration capacity. Infertile sperm samples are expected to penetrate a lower percentage of ova.

The sperm penetration assay is the most accurate test to predict the ability of sperm to fertilize an egg. It also aids in determining if laboratory techniques might improve the sperm's ability to fertilize.



The prepared sperm are incubated with 10-15 hamster eggs. If functionally competent, the human sperm can complete the first steps of fertilization including the penetration of the egg, but nothing happens beyond that point. The penetrated eggs are counted and a percentage is calculated.

When test results are evaluated; if less than 50 percent of the eggs are penetrated in the non-stimulated sperm, there is a decreased ability to fertilize. A percentage higher than 50 indicates that the sperm should have the ability to fertilize. An unstimulated sample with a penetration rate between 30 percent and 50 percent sperm may indicate that stimulation of the sample may improve fertilization during artificial insemination. If a sample has a 30 percent or less penetration rate the likelihood of a sperm defect is high and intracytoplasmic sperm injection (ICSI) joined by IVF is usually recommended.

Anti-Sperm Antibody Test

In males, barriers exist to "hide" sperm from the body's immune system. This is to keep the body from identifying the sperm as foreign, classifying it as dangerous and producing a defense against it. When these barriers break down the body produces anti-sperm antibodies. If these antibodies attach themselves to sperm they cause severely diminished motility and/or agglutination. The presence of antibodies is evaluated by testing seminal fluid, semen, and serum. There should be an anti-sperm antibody evaluation performed prior to a vasectomy reversal, in cases where sperm motility is diminished, samples with an increase of agglutination, or if sperm viability is in question. Females may also produce anti-sperm antibodies. Females should be evaluated if when the physician determines that it is necessary.

Retrograde Analysis

A retrograde semen analysis is indicated for patients with a low volume and azoospermia in the initial semen analysis. Retrograde ejaculation is the ejaculation of sperm into the bladder. Urine voided following sexual activity will contain sperm in men who undergo retrograde ejaculation. Many retrograde ejaculation patients will have had prior surgery or a medical condition that predisposes them to retrograde ejaculation. Predisposing factors include testicular cancer surgery (RPLND), transurethral surgery of the prostate, or childhood bladder surgery. Medical conditions such as diabetes, MS, or spinal cord injury may also predispose an individual to retrograde ejaculation.

Hormone Evaluation

If no sperm are found in the semen or if the count is extremely low, a blood sample may be obtained for the purpose of evaluating the levels of follicle stimulating hormone (FSH), luteinizing hormone (LH), testosterone, and prolactin. Clues from these tests may lead to probable causes and appropriate therapies.

Post Vasectomy Analysis

This test serves as an indicator of the status of an individual's vas deferens patency following a vasectomy. The sample is evaluated for the presence or absence of spermatozoa. If non-motile sperm are present, it may indicate that additional ejaculations are required to fully clear the reproductive tract of sperm. At least 4-5 weeks should elapse after the vasectomy is performed before testing. Several post vasectomy analyses may be needed. The number of samples collected following a vasectomy is under the physician's direction.