
SEMEN ANALYSIS

Semen analysis is the single most important tests in the evaluation for possible male infertility. Sperm count and motility may vary due to a number of reasons; we routinely ask for two to three analyses over 6 to 8 weeks in order to avoid any spurious results. Proper collection of semen is paramount! One should abstain from sex or ejaculation for 3 days prior to collection. The preferred method is masturbation into a specimen cup either at the Andrology lab or at home, provided the sample is brought in within the hour and not be subjected to either excess heat or cold. Other techniques such as early withdraw is not recommended; if one must use a condom, special condom free of lubricant is available from the Andrology lab.

Semen Analysis consists of the following:

- **Volume:** Normal semen volume is between 2-5cc. Low volume, provided the sample was properly collected, may be due to low testosterone level, blockage or underdevelopment of the prostate/seminal vesicles or ejaculation back into the bladder (retrograde ejaculation).
- **Sperm Count:** The "normal" sperm count has been adjusted downward to 20 millions per cc from 60 millions; this is based on the finding that significantly reduced pregnancy rate is not observed until the count is below 20 millions. The preferred term is adequate or acceptable count if one considers the fact that the average sperm count of randomly selected men is around 60 to 80 millions per cc. Low sperm count is termed oligospermia and the complete absence of sperm in the ejaculate is termed azospermia.
- **Motility:** Count and motility are the two important factors; the product of these two parameters, or total motile sperm count, determines male factor related pregnancy outcome. Normal sperm exhibit active forward progression. The degree of motility can be graded from zero (no motion) to 1-2 (twitching or slow moving) to 3-4 (active and straight); at least 60% of the sperm should exhibit grade 3-4 motility. Low or no motility, asthenospermia, has many causes. These include delay in examining the sample, infrequent ejaculations such that the ejaculated sperm have been in prolonged storage, ductal obstructions, anti-sperm antibody (see later), varicoceles, urinary tract infections, abnormal sperm ultrastructures, spinal cord injury and others.
- **Morphology:** Sperm morphology can be assessed by histological determination. Two guidelines are used, the World Health Organization (WHO) standard or the strict/Krueger's criteria. Sperm fulfilling the size, shape and staining characteristic standards are considered normal and recorded. The origin or morphology determination is based on the observations that sperm found in the fallopian tubes and those actually attach and penetrate the eggs during IVFs are mostly sperm with the textbook body, midpiece and tail appearance. These observations and subsequent IVF outcome data led many to believe that it is these "normal" looking sperm that actually "get the job done". In terms of male infertility, morphology has not been found to be as important as count and motility and as such, we have not focused out treatment decisions and recommendations based entirely on morphology. Rare cases such as the round-headed sperm syndrome in which the sperm lack the acrosomal apparatus for egg penetration and the tail stump syndrome in which the sperm tail is short and nonfunctional, morphology then becomes very important.

Anti-Sperm Antibody (ASA): A number of conditions such as vasectomy or obstructions, testicular trauma or torsions, varicoceles and infections may predispose one's immune system to mount a defense against one's own sperm. This reaction may lead to low motility, impaired sperm egg interactions and embryo implantations. Female may also form anti-sperm antibodies. Treatments include reversing the causative conditions, e.g. obstruction or infection, steroids to suppress ASA production, inseminations or IVF.



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Sperm Penetration Assay (SPA): SPA is also known as hamster egg test. It involved incubating human sperm with specially prepared hamster eggs to examine aspects of sperm egg interactions. Fertilization does not take place because of the cross specie nature of the test. Abnormal SPA means inseminations and conventional IVFs are less likely to succeed. Direct injection of sperm into eggs (ICSI) overcomes this defect. Varicoceles and ASA may lead to abnormal SPA.

Hemi-Zonal Assay (HZA): HZA is similar to SPA; the content of human eggs is removed and the egg covering layer (zona pellucids) is divided in half. Each half is then incubated with either sample or fertile donor sperm and compared. The number of sample sperm attached should approach that of the fertile donor.

Computer Assisted Semen Analysis (CASA): Advances in computer software and imaging techniques make CASA more accurate. Additional measurements such as the sperm velocity, sperm head motion excursion etc. can be plotted by the computer. These measurements are for the most part of research interests only; CASA has limited role in the clinical evaluation of male infertility at this time.

Post Ejaculate Urine (PEU): PEU is done in men suspected of retrograde ejaculation. Retrograde ejaculation is common following electrically induced ejaculation (EEJ), in men with neurological disorders and in those who had urological surgeries which prevent the bladder neck closure and forward expulsion of semen. Sperm may be retrieved from PEU, washed and use for inseminations.

Sperm Washing: Freshly ejaculated semen can not be directly placed into the uterus because of its volume and the seminal chemicals which cause intense uterine pain. In men the low sperm count or motility, intrauterine inseminations (IUI) are often tried. A trial of sperm washing will help determine whether enough motile sperm (several millions or more) will survive the process for IUI.