

## Preimplantation Genetic Diagnosis (PGD)

Preimplantation Genetic Diagnosis is an advanced technique which allows individual embryos to be analyzed on a genetic level. This screening method is accurate approximately 90% of the time. This process is performed in conjunction with IVF, and involves the removal, fixation and analysis of a cell(s) from developing embryos. Depending on the genetic condition being screened for, examination of these cells may be performed using different procedures.

Genetic markers for certain diseases, such as cystic fibrosis, are tested utilizing PCR. Chromosomal abnormalities may be identified through FISH analysis.

At CNY Fertility Center, embryo biopsy is performed on the cleavage stage embryo on Day 3. (Egg retrieval and fertilization is designated Day 0). At this time, the embryologist will make a small opening in the zona pellucida

(shell) of the egg, and remove one blastomere (cell) of the embryo. The embryos are placed back in the incubator to continue to grow. The cell will be fixed on a slide or placed in a tube according to the analysis which is to be performed. The material to be tested is sent to the laboratory performing the analysis. Results are generally produced in 24-48 hours, so that an embryo transfer may be performed on Day 5.

PGD is recommended for patients who are affected by, or carriers of, a genetic anomaly in an attempt to drastically reduce the probability of passing the condition to their offspring. PGD may also be indicated in patients of advanced maternal age or with a history of recurrent pregnancy loss. PGD offers a means for family balancing as the gender of the embryo may be determined through chromosomal analysis. PGD may reduce the chance of pregnancy by about 10%. Chromosomal abnormalities may be identified through FISH analysis, or more recently utilizing DNA Microarray Technology (Array CGH).



## Semen Cryopreservation

Semen cryopreservation is the process whereby sperm is frozen for future use. Any male who is planning to undergo medical procedures that may leave him sterile may wish to consider semen cryopreservation. Cancer treatments such as radiation and chemotherapy often reduce fertility or cause sterility. Certain surgical procedures or intensive medication therapy may also result in reduced fertility or sterility. Semen cryopreservation allows semen samples to be stored prior to any procedure of this type, helping to insure the preservation of fertility. Often times, male partners who are scheduled to be out of town during the course of infertility treatment, will freeze a semen sample for use during their absence. Males having difficulty collecting a sample on demand for a procedure may also choose to freeze a sample in advance.

A simple semen analysis is first conducted on the sample. A cryoprotectant, which protects the sperm during the freezing process, is added to the semen sample and gently mixed. The suspension is cooled in a refrigerator for a length of time, and placed into liquid nitrogen vapors. The vials are then labeled with the patient's information, filled with the sample, arranged on a metal cane that is labeled and assigned to only one patient, and then plunged into liquid nitrogen. They are maintained in a liquid nitrogen tank for long term storage.

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## Oocyte (Egg) and Embryo Cryopreservation (Freezing)

Oocyte/embryo cryopreservation is a process where oocytes/embryos are immersed in a series of solutions which dehydrate the cells and replace the water molecules with cryoprotectant, thereby protecting the integrity of the cells during the freezing process. The oocytes/embryos are loaded into specially designed straws, and placed into liquid nitrogen tanks for long term storage. These frozen oocytes/embryos may be subsequently thawed and used for a future embryo transfer. Not all patients undergoing IVF will have embryos for freezing. Surplus embryos remaining after embryo transfer are evaluated, and if they have advanced appropriately developmentally, they may be frozen.

The two primary methods used in the industry for freezing are slow freezing and vitrification. CNY Fertility Center now performs vitrification as our method for cryopreservation.

Indications for egg/embryo cryopreservation include:

- Preserving surplus embryos following embryo transfer which may be used in the future to achieve a pregnancy. By transferring frozen-thawed embryos into the uterus, it is possible to achieve 2 or more pregnancies in different years from a single egg retrieval.

- Preserving fertility in patients who must undergo medical treatments such as chemotherapy for cancer treatment which may affect fertility. By undergoing IVF with embryo freezing, the couple/individual may thaw and transfer cryopreserved embryos following successful treatment.
- **Oocyte (egg) freezing is currently considered investigational** as eggs are much more delicate than embryos when it comes to the freezing and thawing process. Although significant advances have been made in the technique, success rates are still lower than those from embryos. Oocyte freezing may be an option for long term fertility preservation in situations where a female may require cancer therapy treatment, but currently does not have a partner and chooses not to fertilize her eggs with "donor" sperm. **CNY Fertility center is currently performing oocyte cryopreservation on an investigational basis as recommended by ASRM.**

