Acacio
FERTILITY CENTER
Pathway to Parenthood

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EMBRYO/BLASTOCYST CRYOPRESERVATION

There have been dramatic advances in the technology of freezing and storing human embryos for future use. We usually cryopreserve (freeze) embryos at 120-144 hours as blastocysts or sometimes within 24 hours of fertilization (while they are in the pronucleate stage), depending upon patient-specific indications and choices. Regardless of when the freezing process is done, at NYFS, all frozen embryos are transferred at the blastocyst stage. This means that pronucleate eggs are thawed and cultured for a few days. Those that attain the blastocyst stage of development are eligible for transfer to the uterus. Frozen blastocysts are thawed and then transferred a few hours later. Recent technological advances have enhanced embryo/blastocyst freeze-thaw survival rates resulting in a significant improvement in pregnancy rates following Frozen Embryo Transfers (FETs).

It should be appreciated that approximately 15% of frozen blastocysts will likely be lost during the freeze-thaw process. Available evidence suggests that the transfer of thawed embryos/blastocysts does not increase the risk of birth defects. We believe that cryopreservation technology will continue to improve and will contribute significantly to the treatment of infertility in general and to successful IVF in particular. There have recently been major improvements in the cryopreservation of human eggs, with freeze/thaw survival rates similar to those of embryos.

The recipient's cycle is initiated with an oral contraceptive pill (OCP), which is later overlapped with Lupron daily for 5-6 days. Thereupon the OCP is withdrawn and daily Lupron injections are continued until the onset of menstruation, whereupon, the Lupron dosage is administered daily in a reduced dosage until progesterone administration is initiated (see below). At this point, Lupron is discontinued.

Estradiol Valerate (E2V or Delestrogen) (intramuscular) is administered twice weekly, or oral Estrace, commencing within a few days of Lupron-induced menstruation. Plasma estradiol (E2) levels are monitored, which allows for planned adjustment of the estrogen dosage. The objective is to achieve an optimal plasma E2 concentration and a 9mm endometrial lining as assessed by ultrasound examination. The estrogen is continued until the blood pregnancy test. Oral folic acid (in a prenatal vitamin) is taken

daily commencing with the first Estradiol valerate injection, and is continued throughout gestation. The recipient also receives antibiotics (Z-pack) starting with the initiation of Progesterone therapy, until the day of ET. Viagra vaginal suppositories may be used in cases where there is a thin (<9.0mm) endometrial lining.

Luteal support commences 5 days prior to the ET, with vaginal progesterone inserts (Crinone 8% twice daily or Endometrin three times daily) continuing until the completion of the 8th week of pregnancy, or until a blood pregnancy test or ultrasound negates a pregnancy. Pregnancy hormonal support and selective immunotherapy is otherwise administered when indicated, as with conventional IVF patients.

Blood pregnancy tests are performed 9 and 11 days after the embryo transfer. Contingent upon positive blood pregnancy tests, and subsequently upon the ultrasound confirmation of a viable pregnancy, administration of Crinone and twice weekly Estradiol Valerate are continued until the completion of the 8th week of pregnancy.

Success rates following FET cycles, are usually ~ 10% lower than the corresponding rates in the fresh cycles, for the same category of factors. The main reason for this is because usually the best embryos are used for transfer in the fresh state. However, it should be remembered that in order for an embryo to make it to the blastocyst (day 5) stage when they are frozen, and then survive the freeze/thaw, it has already "declared" itself as a strong, viable embryo. Studies have demonstrated that when such embryos implant, the miscarriage rate is very low and these patients are highly likely to progress to term in the pregnancy.

In some patients, we are unable to get appropriate synchronization between the ovaries and endometrium, such that it may be necessary to freeze the embryos in the fresh cycle, and voluntarily create the need for a frozen embryo transfer cycle. Your physician will discuss this with you in advance, as it is certainly not the norm, but has been shown to be efficacious in patients with ovarian-uterine dyssynchrony. In these cases, it may be necessary to perform mock cycles with endometrial biopsies.

Another application of freezing all embryos from a fresh cycle is with the use of preimplantation genetic diagnosis or screening (PGD/PGS). A biopsy is taken from the blastocyst on day 5 or 6, and testing is done on the embryos' genetic content. There is good data of excellent success rates with freezing all of the biopsied embryos and then transfering the best ones in a subsequent FET.

It remains on the marvels of modern medicine that we are able to freeze these "potential human beings"

almost indefinitely and then thaw them for transfer. We shall never forget a patient we once had, who did not have a fresh transfer for concerns of Ovarian Hyperstimulation Syndrome. Therefore, all of her embryos were frozen. She returned for a subsequent cycle and conceived with her first child using a frozen embryo. A few years later, she came back for another attempt with her remaining frozen embryos, and she brought her almost 2 year old son along to one of the visits. As he came running down the hallway to find his mom, we stood in absolute awe for the fact that several years earlier, he was stored in a state of suspended animation in a vial in a tank of liquid nitrogen at negative temperatures; yet before our eyes, he was running down the hall to find his mom. The story became more remarkable when his mom conceived again with an embryo from the remaining ones in our tanks. Was this her older son's twin? Not really. All we know is that this is truly amazing medical science that allows stories like this to unfold!

Rev. 10/13

This handout is intended as an aid to provide patients with general information. As science is rapidly evolving, some new information may not be presented here. It is not intended to replace or define evaluation and treatment by a physician.