

MICROSORT® SPERM SEPARATION

Please refer to the MicroSort® web site (www.microsort.com) for current data and detailed information.

Background

People have been trying to influence the sex of their babies for centuries. Until recently, the technologies to accurately determine the sex of a baby were inaccurate. Now, a new technology called **MicroSort®** makes gender selection much more realistic. MicroSort® uses a technique called flow cytometry to enrich the population of sperm containing the desired sex chromosome (X or Y) that scientifically determines the genetic sex of the baby.

MicroSort® is a **research technique** that is currently in a **clinical trial**. The FDA requires that new medical devices prove their safety before they can be used as a routine clinical service. In the case of MicroSort®, the developers need to prove that the entire process does not lead to an increased incidence of miscarriages or birth defects. Miscarriages are common in human pregnancies as about 15% of clinical pregnancies (a pregnancy in which the woman knows she is pregnant) fail and miscarry. About 4% of all live births have some type of birth defect.

Thus the MicroSort® developers must demonstrate that there is no increase in these pregnancy complications. The FDA requires that statistical mathematics confirm that the miscarriage and birth defect rates are the same as in nature. The math calculations suggest that if the first approximately 750 births are similar in outcome to natural births then the research trial will be over. Please refer to the MicroSort® web site for details (www.microsort.com).

MicroSort® Technique

The technique basically involves processing sperm with a special stain for the DNA content. Sperm cells contain the same chromosomes except for the sex chromosomes. Each sperm contains either an X chromosome (which produces a girl) or a Y chromosome (which produces a boy). The sperm are then analyzed by a flow cytometer for the DNA content of the sperm. The flow cytometer is a very sophisticated machine used in many labs to identify cell types based on cell physical characteristics and the presence of specific stains to cell components. This description of a flow cytometer is a bit simple but provides you with an idea of what is happening.

MicroSort® relies on the fact that the X chromosome is large and the Y chromosome is small, thus the amount of DNA stain is different between a sperm containing an X or a Y chromosome.



From the drawing on the left, you can see that we would expect to find much more DNA stain in the sperm containing the X chromosome. Because the other 23 chromosomes are the same in both X and Y chromosomes, the difference in total DNA stain is about 2.8%.

The flow cytometer must then distinguish between an X-bearing chromosome and a Y-bearing chromosome. The flow cytometer has the ability to send a cell with certain characteristics into a collection container. When the flow cytometer's computer decides whether it believes that the sperm contains an X or a Y then it sends the sperm into the collection container if the sperm contains the desired sex chromosome.

MicroSort® flow cytometry is more accurate for X-sorts (attempting to collect X-bearing sperm) than it is for Y-sorts (attempting to collect Y-bearing sperm). The MicroSort® web site recently posted overall sort purity of 88% for X-sorts (with 91% of deliveries being a girl) and 73% purity for Y-sorts (with 76% of deliveries being boys).

Treatment Techniques

MicroSort® separated sperm yield very acceptable pregnancy rates from insemination with fresh (non-frozen) sperm. NCRS cannot use fresh sperm because the closest MicroSort® center is in CA. Consequently, we offer to ship frozen sperm to the closest MicroSort® center for sorting. Alternatively, the man may travel to a MicroSort Center for a fresh sort of the sperm. The MicroSort® center then freezes the sorted sample and ships it back to us (freeze-sort-freeze or sort-freeze respectively). We must then use the sample with IVF (in vitro fertilization) and ICSI (intracytoplasmic sperm injection) because the number of viable motile sperm is too low for insemination.

The probability of obtaining the desired sex is then determined by the sort purity for the desired sex chromosome. Please refer to www.microsort.com for the latest statistics. Nevertheless, the sort purity for your specimen is what determines your chances. Some couples desire a 100% (or as close to that number as is humanly possible) likelihood of the desired sex of their baby. We combine IVF/ICSI with **PGD** (*preimplantation genetic diagnosis*) to remove a cell from the embryo to test for the sex of that embryo. We then only transfer the embryos of the desired sex.

Please refer to our IVF, ICSI and PGD Fact Sheets (all are available at www.nwreprosci.com) for additional details on these treatments.

Caution this procedure uses an investigational device. Limited by Federal Law to investigational use.