HYPO-OSMOTIC SWELLING TEST

The test of the ability to adapt to osmotic changes.

About Hypo-osmotic swelling test

The Hypoosmotic Swelling Test is a laboratory test to measure the functional integrity of the human sperm membrane. In this test, the sperm is exposed to a hypooosmotic solution (if its osmotic pressure is lower than its surroundings) consisting of a 50:50 mixture of 150 mosmol fructose and 150 mosmol sodium citrate at 37°C for 15 min. The samples are then fixed in buffered solution (a means of keeping pH).

A hypo- or hypertonic (the concentration of solutes is greater outside the cell than inside it) environment, cells tend to adjust and reach osmotic equilibrium (all competing influences are balanced) by allowing water and solutes to change across the cell membrane. The tails of normal sperm will swell (Pic. 1) when exposed to this solution, whereas damaged sperm with low motility will not swell measurably.

Some infertile men have genetically immotile sperm and are unable to become fathers. The Hypoosmotic Swelling Test is a therapeutic tool that harmlessly and physiologically “pokes” a non-moving sperm to determine whether it is alive and therefore able to be used for ICSI (intracytoplasmic sperm injection).

Success or failure factors

It is possible that a number of sperm cells may die if prolonged incubation periods are used, biasing the results. However, it becomes more precise if performed with the aid of an electronic cell counter. In this approach, known as the volume regulatory test, after the osmotic challenge, sperm passes through a capillary pore and cell volume is determined upon changes in the electric resistance to passage. The results are expressed as cell frequency distribution for the iso- and the hypooosmotic moments of the test and the amount of displacement of the distribution curve, which reflects the adaptability of the sampled cells.

Complications

Sperms that are obtained and examined are used for an ICSI. The problem that results from this technique is simple. The tails of sperms are curved and swollen which leads to difficulties with collection and manipulation of sperms in needle.

Prognosis

The results shows that this method is simple, practical and successful and it has higher fertilization rates in compare to morphological selection.
Pic
Spermatozoa in a HOST test.

Sources


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