Use the Nanoparticles to improve the quality of Human semen for capacitation and Acrosome reaction.

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Reproductive problems such as poor quality or quantity of sperm, sexual dysfunction, and hormone disorders are of great concern and cause considerable distress, anxiety and a decrease in sexual confidence especially in males. Studies have shown that the male factor contributes approximately 30-50% to fertility-related cases and that almost 50% of male infertility cases are classified as idiopathic. Human spermatozoa from a total of 25 semen samples were washed with human tubular fluid medium supplemented with bovine serum albumin (HTF-BSA) and incubated for 2 hours followed by incubation with different concentrations of Nanoparticles and control for 1.5 hours at 37°C. Samples were analyzed for calcium homeostasis, capacitation, sperm motility, reactive oxygen species (ROS) modulation, DNA-fragmentation as well as acrosome reaction. For Ca^{2+} flux studies, a high-throughput fluorescence Ca^{2+} flux assay was used. However, the technology targets 3 to 4 surface markers on sperm with Nano magnetic particles. These targets are apoptotic sperm, acrosome reacted sperm, DNA fragmentation and membrane damaged sperm. After incubation at room temp the mixture of particles and sperm are placed against a laboratory magnet for removal of the targeted deficient sperm, the supernatant contains the viable sperm. In so doing, we enrich for viable non DNA damaged sperm for use in IVF.

Key words: DNA fragmentation, ROS, Capacitation and Acrosome reaction.