

## Cell-based therapy: A Ray of Hope for Infertile Couples

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### Abstract

Parenthood is considered a blessing in the life of a couple. In particular, becoming a mother is one of the most beautiful phases of a woman's life. Unfortunately, with changing lifestyles, stress, and the increasing incidence of diseases, the rates of infertility have also increased. Infertility is a condition in which a sexually active couple fails to conceive, even without using contraceptive techniques after 1 year. The WHO ranks infertility in the young population as the fifth highest serious global disability. A survey conducted in India reported that the prevalence of primary infertility among women in urban areas was approximately 4%, while that among those in rural areas was 3.7%. However, considering various social, psychological, financial, and other factors, the estimates of infertility vary widely among Indian states. Male and female infertility can be attributed to various causes such as: a- Dysfunction in hormones for sperm production, b- Erection and ejaculation problems, c- Blockage of sperm transport, d- Blocked or damaged fallopian tubes, e- Fibroids, endometriosis, f- Polycystic ovarian syndrome etc. In recent years, cell-based therapy has gained popularity to treat various conditions. The classical dogma regarding female fecundity was that a female is born with fixed number of follicles. However, this has now been challenged by detection of ovarian stem cells (OSC) in the ovarian surface epithelium. Similarly, progenitor cells have also been identified in male testicles. Furthermore, treatment of infertility with adult stem cells, which have the capability to transdifferentiate into oocyte-like cells and spermatogonial stem cells, is a promising approach. The human body can be considered a "bioreactor," which provides a favorable, natural environment to the transplanted cells. Spermatogonial stem cells (SSCs) are the male germ line stem cells, which are responsible for the production of sperms throughout life. These cells when transplanted can treat male infertility by stimulating spermatogenesis. Similarly, in cases of female infertility, trans differentiation into oocytes is possible vitro fertilization (IVF). In addition, mesenchymal stem cells which can then be used for in vitro maturation (IVM) and in addition, mesenchymal stem cells can be obtained from these tissue sources as well as from bone marrow and adipose/fat tissue for management of various conditions. Furthermore, novel regenerative medicine approaches for infertility management include the use of very small embryonic-like stem cells (VSELs) and lyophilized platelet rich plasma that have shown tremendous potential in preserving fecundity as well as in endogenous regeneration of healthy cells. Other causes of infertility may also be treated with cell-based therapy alone or a combination of cellular and assisted reproductive

techniques. Genetic modification of germ lines will be possible in the future to treat and preserve fecundity in infertile patients. This presentation will explain each of the aforementioned aspects in detail to provide novel insights into the treatment of infertility.

### Biography:

Dr. Mahajan completed his masters in General Surgery from Marathwada University, Maharashtra and went on to pursue Diploma in Urology at the University of Vienna, Austria. He is also a principal investigator in collaboration with Indiana University, Indianapolis under the guidance of Dr Chandan Sen to conduct the first human clinical trials using TNT technology as well as treatment of leukoderma using TNT technology in India. Recently he has also been featured in the Forbes Healthcare magazine for his pioneering work in the field of stem cell research. His vision is to achieve excellence in cell-based therapy at a global level, while also ensuring that the technology is accessible to the masses. In his own words "You carry your own repairing kits within your body". Soon, I believe that there will be a day when treatments will comprise of Cells and not Pills!".

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