

IIT Hyderabad along with Kasturba Medical College, Manipal Researchers, designed a molecule ‘mPTX’ to enhance sperm competence for IVF

mPTX, can increase sperm motility, prolong in-vitro sperm survival and improve sperm fertilization potential compared to the widely used pharmacological agent, pentoxifylline, in IVF technology.

Highlights:

- ***mPTX enhances motility and longevity of sperm from patients with poor motility***
- ***Reduces embryo toxicity***
- ***mPTX treatment prevents premature acrosomal reaction in sperms***
- ***mPTX treated sperms have better DNA integrity***
- ***mPTX can be a better drug for enhancing sperm competence for IVF***

Hyderabad, August 10, 2021: Dr Rajakumara Eerappa’s group from the Department of Biotechnology, IIT Hyderabad, Dr Jagadeesh Prasad Dasappa’s group from the Mangalore University, and Prof Guruprasad Kalthur’s group from the Kasturba Medical College, Manipal, Manipal Academy of Higher Education, have designed a small organic molecule mPTX which improves the sperm functional competence required for in vitro fertilization (IVF). Their studies have demonstrated that mPTX, a pentoxifylline derivative, was able to increase sperm motility, prolong in vitro sperm survival, improve sperm fertilization potential, without adversely affecting the development of the embryos at much lower concentration compared to the widely used pharmacological agent - pentoxifylline in IVF technology. The mPTX molecule is proposed to be a better pharmacological agent for assisted reproductive technology than the existing drugs.

Expressing his delight on this technological advancement, Prof B S Murty Director IIT Hyderabad added, “The joy of parenthood can’t be defined in words. The work led by Dr Rajakumara and his collaborators can bring the happiness of being parents in the infertile couples, by increasing the success rate of IVF. IITH is one of its kind institutes to have both Biomedical & Biotechnology Department separately nurturing the talents. This also demonstrates the power of synergistic collaborations. I am confident that many such technologies significantly impacting the society will keep getting developed at IITH continuously”.

With an estimate of around 48 million infertile couples worldwide, reduction in sperm motility is one of the major causes of male infertility. Motility is essential for sperms to reach the site of fertilization during natural conception. In addition, the percentage of motile spermatozoa present in ejaculate helps in deciding the ideal artificial insemination method such as IVF for infertility treatment. Pentoxifylline treatment increases sperm motility which goes hand in glove with the undesirable premature acrosomal reaction, which together determines the success of IVF. The purpose of this DST-SERB funded project was to improve the efficacy of pentoxifylline and to reduce its adverse effects on sperms competence and embryo development.

The team has designed a molecule, mPTX, which has shown enhanced human sperm motility and longevity both in ejaculated and testicular spermatozoa characterized with poor motility. It has minimal toxicity on mouse embryos. At the same time, it reduces the premature acrosomal reaction, which is undesirable in IVF. Therefore, mPTX can be a potential drug candidate for aiding viable sperm selection in the patients having immotile or poor motile spermatozoa in the ejaculate or from the testicular biopsy, and for increasing sperm motility before IVF.



Recently this work has been published in the reputed peer-reviewed journal, Nature Scientific Reports. The research article has been co-authored by scientists Dr Rajakumara Eerappa, Dr Guruprasad Kalthur, Dr Jagadeesh Prasad Dasappa, Dr Satish Kumar Adiga and Dr Padmaraj Hegde along with research scholars Mr Satish Mutyala, Ms Sadhna Kumari, Ms Deeksha Waghela, Mr Abhishek Suman and Mr Nitin Kulhar.

Citing the importance of solutions in given circumstances, Dr Rajakumara Eerappa, Associate Professor, Department of Biotechnology, said, “Our multi-institutional collaborative team is coming up with a formulation, using the combination of this mPTX and other molecules, that could be more effective than the existing formulation for the IVF procedure.”

URL link of the publication: <https://rdcu.be/cmhws>

Electronic Press Release: https://youtu.be/grUr-9_X7cw

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