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Korean stem cells that can be transformed into organs

October 22, 2012 | News | By BioSpectrum Bureau

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Singapore: Korean scientists have developed a breakthrough technology that can more efficiently and safely reprogram adult cells to an embryo-like state, which can then in-turn be programmed into organs. The research was conducted by two teams led by professor Park Se-pill at Stem Cell Research Center, Jeju National University, and Mirae Biotech. The two organizations succeeded in generating induced pluripotent stem cells using non-viral vectors of nanoparticles and liposomal magnetofection. The findings have been published in the latest edition of PLOS One during late last month.

The induced pluripotent stem cells (iPS) cells can be transformed to an infant state that can differentiate into replacement tissue to treat patients with neurogenetic disorders. The type of cell was first created in 2006 by Kyoto University professor Shinya Yamanaka by delivering four genes into a lab mouse through viral vectors, for which he won the 2012 Nobel Prize for Medicine or Physiology.

The Korean researchers used nanoparticles, a biodegradable agent, and liposomal, which works like a magnet, to deliver genes into an adult stem cell nucleus of a mouse, instead of using viral vectors that often cause cells to die and develop cancer. The iPS cells reverted to their initial type and then differentiated into various cells such as neurons, cardiac muscular cells and cartilage cells.

This is the first time that a non-viral system has been developed. Not only is it free from dangerous side-effects, the method significantly boosts the efficiency and shortens the time of iPS cell production, he said. Dr Park also said that the method is

simple, hoping this latest development would help his team secure funding to further research stem cell-based therapeutics.

The research using iPS cells can bypass ethical questions plaguing embryonic stem cells, which critics deem to be early human life. Dr Park, well known in Korea for his animal cloning and embryonic stem cell research, said that his findings would boost hopes for developing therapies for patients with nervous system diseases.