Pluripotent Human Spermatogonial Stem Cell-Derived Cells

Stanford researchers have derived human multipotent germline stem cells (hMGSCs) from a testis biopsy. The biopsied cells show multiple characteristics of pluripotency. These data suggest the potential to derive pluripotent cells from human testis biopsies but indicate a need for novel strategies to optimize hMGSC culture conditions and reprogramming. The ability to isolate and culture hMGSCs in vitro may facilitate development of novel therapeutic strategies for the treatment of infertility (e.g., caused by cancer treatment). hMGSCs represent a source of patient-specific stem cells appropriate for the study of genetic diseases in different cell lineages in vitro and for potential novel therapeutic applications, in particular fertility.



Figure description: A schematic illustrating the methodology adapted from previous reports and used in isolation of cell populations (Leydig cells, peritubular myoid cells and Sertoli cells) from human testis.

Stage of Development

The researchers recently sought to determine if populations of cells enriched for all three major somatic testicular cells could be isolated from testes of single human donors, and were successful in doing so from testes of three donors. Furthermore, they found that human Sertoli cells (SC) feeder layers could facilitate germ cell progression of human embryonic stem cells (hESCs) by microarray analysis of gene expression.

Applications

- Novel therapeutic strategy for infertility treatment and fertility preservation for men
- Novel in vitro model for the study of adult stem cell biology, human spermatogenesis, testis cancer and other testis diseases
- Development an in vitro model for assessing the reproductive toxicology of chemicals and drugs

Advantages

• Derivation of pluripotent cells with optimized culture conditions, not genetic modification

Publications

- Kossack N, Meneses J, Shefi S, Nguyen HN, Chavez S, Nicholas C, Gromoll J, Turek PJ, Reijo-Pera RA. <u>Isolation and Characterization of Pluripotent Human</u> <u>Spermatogonial Stem Cell-Derived Cells.</u> *Stem Cells Express.* 2008 Oct 16.
- Gaur M, Ramathal C, Reijo-Pera RA, Turek PJ, John CM. <u>Isolation of Human</u> <u>Testicular Cells and Co-Culture with Embryonic Stem Cells.</u> *Reproduction* 2018, 155(2) 151-164.

Patents

- Published Application: 20100267134
- Issued: <u>8,673,637 (USA)</u>

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