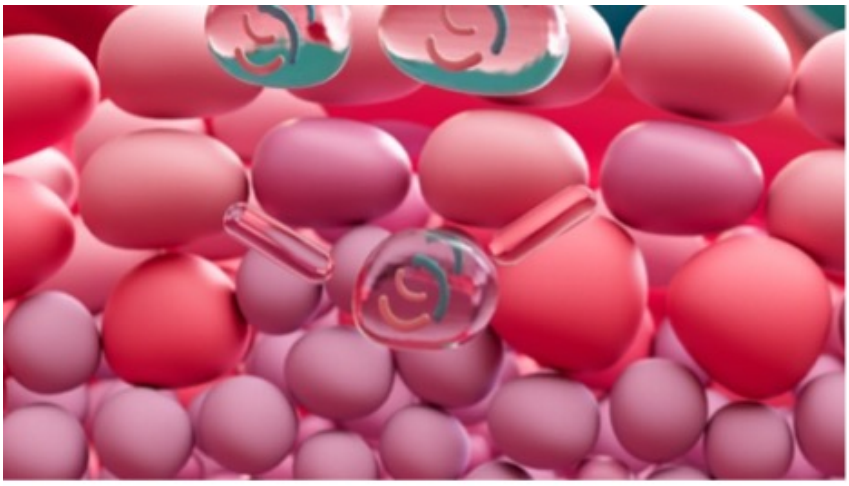
INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Generation of Human Sertoli Cells to Support In Vivo and In Vitro Gametogenesis

Technology number: 2021-502



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Category
Research Tools and Reagents

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OVERVIEW

Enhancing somatic cell specification to improve reproductive health

- Cost-effective and ethically viable testis cell generation
- May treat infertility, rejuvenate aging gonads, and repair therapy-induced damage

BACKGROUND

Somatic cells in the testis are essential for maintaining testis tissue homeostasis and ensuring men's reproductive health. Historically, research has focused on identifying the necessary growth factors and cytokines that guide germ cell development in vivo. Co-culturing of in vitro derived primordial germ cell-like cells (PGCLC) with fetal somatic cells from mice has been a common approach. However, these practices are cost-prohibitive for non-human primates and raise ethical issues in humans. Consequently, current techniques struggle with high costs and ethical dilemmas, hampering broader application and accessibility. There is, therefore, a critical need for an improved method to generate somatic cells. This method would ideally be cost-effective and ethically sound, addressing the gaps in existing technologies for better clinical and research outcomes in reproductive health.

INNOVATION

Researchers have created a method to leverage single-cell RNA sequencing data to reconstitute human Sertoli cells from embryonic stem cells (ESCs). By testing various differentiation cocktails, researchers discovered that an Insulin and IGF combination alone efficiently induces Sox9+ cells, crucial markers of Sertoli cells. By day 18, these cells demonstrate multiple Sertoli cell markers, including EMX2, WT, SOX9, and LHX9, with some cells self-assembling into organoids validated through immunostaining. This breakthrough offers a cost-effective and ethically viable alternative to conventional methods, allowing the generation of functional testis cells in a laboratory setting. Potential applications include treating male infertility, rejuvenating aging gonads, and replacing damaged testis cells caused by cancer therapies, thereby addressing pressing issues in reproductive and overall health.