Unravelling the complexity of human oogenesis and reproductive tract development

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Stellingen behorende bij het proefschrift

Unravelling the Complexity of Human Oogenesis and Reproductive Tract Development

1. A properly developed ovarian niche and primordial follicles are essential pillars of female fertility. (**McGee & Hsueh, Endocr Rev. Apr;21(2):200-14 (2000)**)
2. Changes in cell rigidity and cell-cell adhesion within the ovarian cords may promote the formation of primordial follicles. These changes facilitate the development, positioning, and maintenance of cell protrusions in pre-granulosa cells, which guide their attachment to specific human fetal germ cells (hFGCs) in preparation for follicle formation. (**This thesis**)
3. The exact mechanism of primordial follicle formation in humans remains elusive due to ethical and technical challenges. This difficulty arises from the inaccessibility of fetal ovaries and the absence of in vitro culture methods that would enable functional analysis of this process. (**This thesis**)
4. Providing adequate physical support is essential for ex vivo culture of human fetal ovaries.(**This thesis**)
5. A thorough understanding of tissue morphology, cellular functions, and organ development is essential for deciphering biological processes through single-cell RNA sequencing and other -omics techniques. (**This thesis**)
6. A comparative single-cell transcriptomics analysis of cells in female and male mesonephroi provides a comprehensive overview of the molecular profiles associated with the transition from the fetal mesonephros to the sex-specific reproductive tract. (**This thesis**)
7. In vitro gametogenesis has great potential for reproductive medicine, including novel diagnosis and modeling of infertility. (**Saitou & Hayashi, Science 374, eaaz6830 (2021)**)
8. The discovery of new cell subpopulations in fetal human gonads, along with improved molecular and biophysical characterization of somatic cells, will establish a strong foundation for developing systems to differentiate gonadal somatic cells from hiPSCs, thereby advancing new protocols for in vitro gametogenesis. (**Garcia-Alonso, et al., Nature 607, 540–547 (2022)**)
9. "Nature, to be commanded, must be obeyed." (**Sir. Francis Bacon (1561-1626)**). To faithfully reconstruct human gametogenesis in vitro, a deep and comprehensive understanding of both normal and abnormal gametogenesis is required.
10. Scientists do not discover in order to know, but rather, they know in order to discover. (**Alfred North Whitehead**, ***The Aims of Education and Other Essays***. **(1929)**). Knowing isn't passive; it's a starting point. Scientific knowledge fuels curiosity, enabling scientists to venture into new, uncharted territories with purpose and direction.