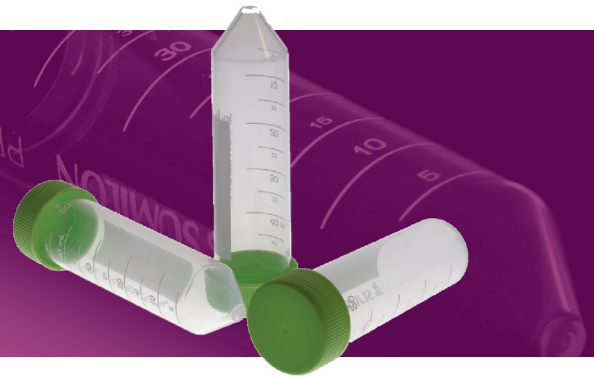
RESEARCH PAPERS

Introduction of Stemfull™



To minimise cell adhesion and cell loss, centrifugation low binding tubes were used in this study to obtain high-quality scRNA-seq data.

Kenta Yamamoto, Toshiro Yamamoto, Yoshihiro Sowa, Makoto Seki, and Osami Mazda
Stem Cell Research & Therapy 16, 597 (2025). https://doi.org/10.1186/s13287-025-04605-x

Background

The early stage of human pregnancy initiation is marked by embryo implantation into the uterine endometrium; however, the underlying mechanisms remain largely elusive due to ethical restrictions and technical challenges. In particular, the 3D architecture of endometrial epithelial, stromal, and endothelial cells and their functional interactions with the embryo remain poorly understood. Traditional 2D culture models and simple coculture systems have failed to replicate in vivo tissue architecture, hormone responsiveness, and intricate cell-cell interactions.

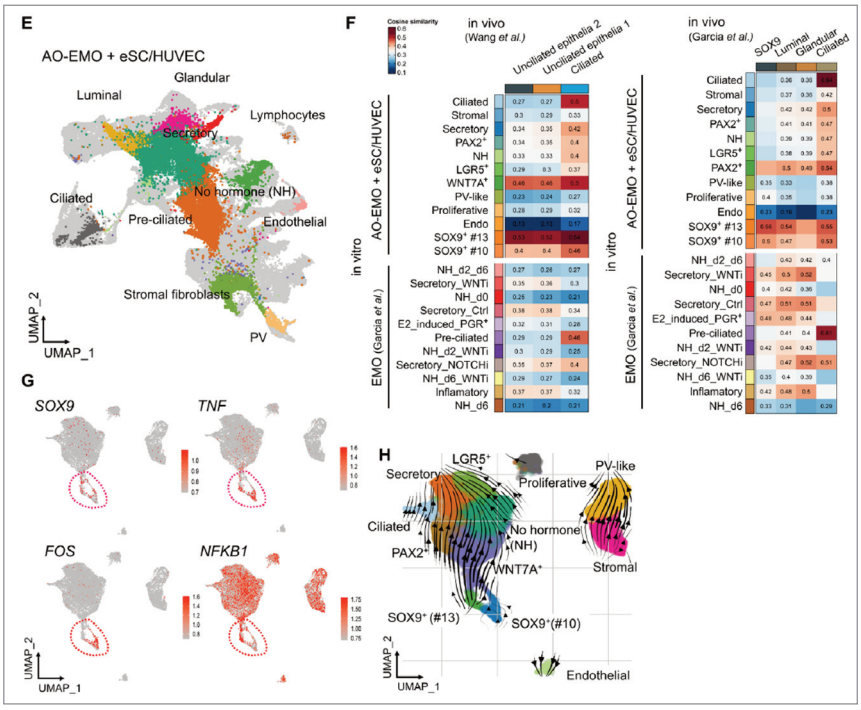


Figure 7 *illustrates the characterization of exosomes derived from chemically induced MSCs (cdMSCs), including size distribution, expression of exosomal markers CD9 and CD81, and their role in promoting polarization of macrophages from pro-inflammatory M1 to anti-inflammatory M2 phenotype in vitro.*

Research Achievements

In this study, the authors developed hormone-responsive apical-out endometrial organoids (AO-EMO) that recapitulate the in vivo architecture of endometrial tissue. AO-EMO exhibited an outwardly oriented apical surface, dense stromal cells, and a self-assembled endothelial network with enhanced maturation and secretory functions upon hormonal stimulation. Coculturing AO-EMO with human embryonic stem cell-derived blastoids established a 3D feto-maternal assembloid system which recapitulated crucial implantation stages, including apposition, adhesion, and invasion. Invasion and fusion with syncytial cells and endometrial stromal cells were validated in this model using human blastocysts. Using human blastocysts, they demonstrated their adhesion onto AO-EMO surfaces and invasion into epithelial cells, enabling detailed investigation of cellular fusion and interactions during implantation.

This model, faithfully recapitulating human embryo implantation processes, This system provides a novel experimental platform to dissect the complex biochemical and physical interactions at the embryo-maternal interface, supplying insights for advancing reproductive medicine.

Use of STEMFULL™ in This Research

STEMFULL™ was utilized during single-cell RNA sequencing (scRNA-seq) sample preparation to handle cell suspensions. It minimized cell adhesion and loss, thereby contributing to the acquisition of high-quality scRNA-seq data.

(For details, please refer to the paper)

Cat #	Product name	Material	Capacity	Packaging
MS-90150	STEMFULL™	Main body: PET Lid: Polyethylene	15 mL	5 pieces per pack 100 pieces per case

PHC Europe
A Member of PHC Group

Eikdonk 1 | 4825 AZ Breda | Netherlands
T: +31 (0) 76 543 3833
www.phchd.com/eu/biomedical