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Technology Offer

Human stem cell-derived pancreatic acinar organoids for PDAC research and exocrine disease modelling

Ref.-No.: 0706-6879-IKF

Bridging the gap in pancreatic cancer research: a defined, iPSC-compatible platform delivering bona fide human acinar cells for disease modelling and therapeutic development.

Background

Pancreatic ductal adenocarcinoma (PDAC) is one of the deadliest cancers, with most tumours originating from acinar cells that undergo acinoductal metaplasia upon oncogenic insult. Acinar cells are also centrally implicated in pancreatitis and exocrine insufficiency. Despite their pivotal role, no robust method to generate fully functional human acinar cells in vitro has previously existed, severely limiting mechanistic studies, drug discovery, and therapeutic development.

Technology

Researchers at the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden have developed the first protocol to generate functional human pancreatic acinar cells from pluripotent stem cells (iPSCs). The key discovery is that inhibition of GSK3α/β, activating WNT signalling, combined with removal of fibroblast growth factor (FGF) from the culture medium is sufficient to drive progenitor cells to fully differentiated acinar cells. The resulting organoids self-organise into characteristic acinar-like structures, produce functional digestive enzymes (amylase, trypsin, carboxypeptidase), and display zymogen granules confirmed by electron microscopy, all hallmarks of bona fide acinar cells.

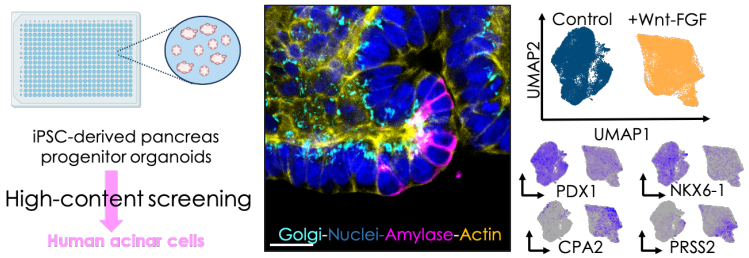

***Figure 1**: Schematic representation of the image-based screening leading to the discovery of a method to produce acinar cells from pancreatic progenitors (Kehsara et al. 2026).*

Key features

- Minimal, defined protocol
- Unprecedented functionality
- Canonical acinar identity
- High-content screening compatible
- iPSC-compatible

Applications

- Modelling of PDAC initiation
- High-throughput drug screening
- Disease modelling
- Personalized medicine
- Potential cell source for cell therapy

Patent Information

The international patent WO2026099481A1 was filed in 2025.

Publications

Keshara et al., Cell Stem Cell, 2026, doi: 10.1016/j.stem.2025.12.023
Nakamuara et al., Stem Cell Reports, 2022, doi: 10.1016/j.stemcr.2022.03.013
Larsen et al., Nat Commun., 2017, doi: 10.1038/s41467-017-00258-4

Opportunity

We are seeking licensing partners or research partnerships to develop this technology further.

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