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Summary

ENGINEERING AND CHARACTERIZATION OF FUNCTIONAL STEM-CELL DERIVED ACINAR-LIKE ORGANOIDS FOR DISEASE MODELING OF PANCREATIC EXOCRINE DISORDERS

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Pancreas

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Researchers developed a protocol to generate functional and mature pancreatic acinar-like organoids from human embryonic stem cells using GP2-enriched progenitors and single-cell transcriptome-guided pathway modulation.

KEY POINTS

- The optimized protocol robustly produces pure mature and functionally active pancreatic acinar-like organoids validated by high resolution imaging, electron microscopy, enzyme activity assays, and transplantation studies.
- Enrichment for multipotent pancreatic progenitors was facilitated by double magnetic activated cell sorting to isolate GP2 high expressing cells.
- High resolution imaging and transmission electron microscopy revealed the presence of secretory vesicles and digestive enzymes in the organoids.
- The stem-cell derived pancreatic acinar-like organoids provide a human model system to investigate pancreatic exocrine disorders like pancreatic cancer or pancreatitis in an animal-reduced setup.
- This work addresses a gap in literature where engineering pancreatic acinar cells has been underrepresented compared to endocrine and ductal organoid models.

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