

# TrailBio<sup>®</sup> Insulin-Producing Islet-like Clusters

## Cells

Trailhead Biosystems<sup>®</sup> offers **insulin-producing islet-like clusters** derived from iPSC cultures. These pancreatic islet-like clusters exhibit consistent phenotypes and are composed of mixed endocrine cell populations, with a majority **expressing insulin**, suitable for **drug screening** and studies investigating **islet cell physiology**. Pancreatic islet cells play a key role in regulating and maintaining proper blood sugar levels and contribute to the overall regulation of metabolism throughout the body. Inappropriate function, or overall loss of islet cells is the main contributor to **diabetes** in patients.

## Platform

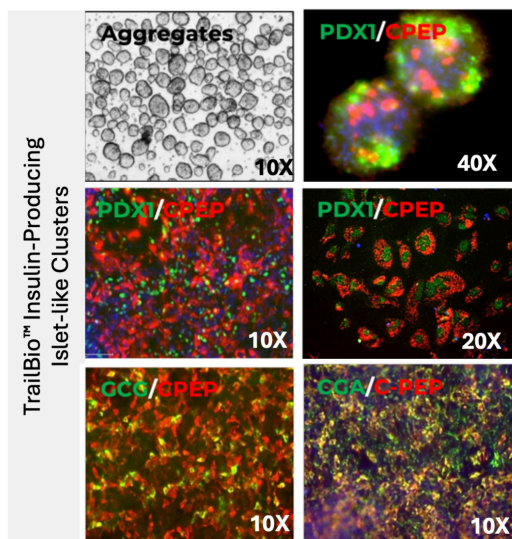
Using our proprietary **HD-DoE<sup>®</sup>** (High-Dimensional Design-of-Experiments) technology, we created a multistage approach for the differentiation into insulin-producing islet-like clusters demonstrating a glucose stimulation index.

## Quality

Quality is defined at multiple stages during manufacturing using flow cytometry, gene expression by qRT-PCR, bulk RNA-seq data, cellular identity and functionality of cells is determined by key cellular markers using immunocytochemistry (ICC) data and functional assays.

## Data

TrailBio<sup>®</sup> Insulin-Producing Islet-like Clusters gene expression and functional assessment. Gene expression analysis shows that upon differentiation, these cells express key insulin-producing islet-like markers (Fig 1, expression of relevant markers by ICC staining). Cellular identity and functionality is demonstrated by analysis of C-Peptide protein expression and glucose-stimulation assays. (Fig 2)

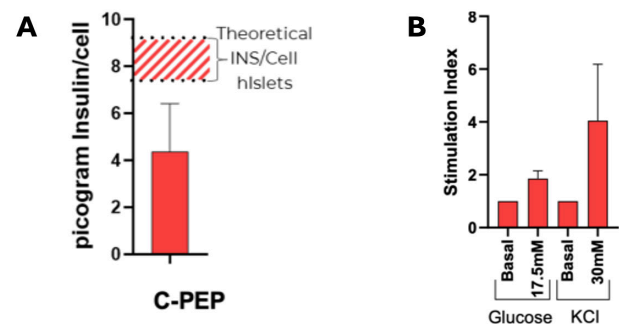


**Fig 1. Cell Characterization by ICC**

**Top row:** Imaging of islet-like aggregates and ICC staining of aggregates

**Middle row:** Expression of pancreatic and duodenal homeobox 1 (PDX1) and C-Peptide (CPEP) in aggregates which indicate islet-like cells.

**Bottom row:** Expression of Glucagon (GCG), chromogranin A (CGA) and CPEP, which identifies the cell types within the islet-like aggregates.



**Fig 2. Cellular Identity and Functionality**

**(A)** C-Peptide production indicates the identity of the cells.

**(B)** Functionality of the insulin-producing islet-like cells is demonstrated by Glucose stimulation index.

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## Format

Product	Cell Density	Product #
TrailBio® Insulin-Producing Islet-like Clusters	5 X 10 <sup>6</sup>	EN-01-05

Production	
Donor Information	Human Male
Source Cell	iPSCs from CD34+ Cord Blood
Karyotype	Normal
Configuration	Cryopreserved Cells Aggregates

Handling	
Shipping info	Dry Ice
Storage	Liquid Nitrogen
Usage	Research Use Only

## Trailhead® Cells

- **Built from Scratch:** We create novel protocols for producing specialized human iPSC-derived cells
- **HD-DoE® Platform:** Protocols are built by exploring high-dimensional space of regulatory inputs
- **Data, Not Hypothesis, Driven:** Our methods are based on empirical data obtained using HD-DoE®
- **Quality by Design:** Product development adheres to a Quality-by-Design standard at all stages
- **Cellular Identity:** Cell fate is confirmed by molecular and functional attributes

## Applications

Trailhead's cells are well suited for use in 2D and 3D applications, including drug discovery, disease-modeling, drug toxicity, 3D tissue printing, organoid formation, tissue on-a-chip manufacturing, and functional assay development.

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