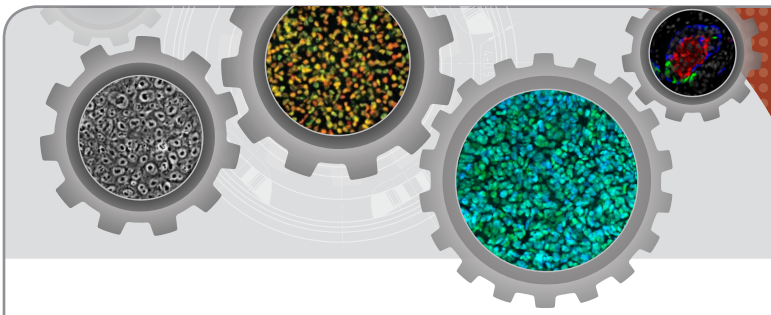

STEMdiff™ Pancreatic Progenitor Kit

Reproducible and Efficient Differentiation of hPSCs to Pancreatic Progenitor Cells

The **STEMdiff™ Pancreatic Progenitor Kit** is a novel serum-free, defined medium system that supports efficient and reproducible generation of pancreatic progenitor cells from human embryonic stem (ES) cells or induced pluripotent stem (iPS) cells. The kit directs efficient differentiation from multiple human pluripotent stem cell (hPSC) lines through definitive endoderm, primitive gut tube and posterior foregut endoderm before becoming pancreatic progenitor cells. The differentiated cells are characterized by expression of key transcription factors including PDX-1, NKX6.1 and SOX9. The resulting pancreatic progenitor cells can be used for studying disease modeling, pancreatic cancer, and development of pancreatic cell lineages, including β-cell maturation for diabetes-related research.

PRODUCT	CAPACITY	CATALOG #
STEMdiff™ Pancreatic Progenitor Kit	1 kit	05120

Why Use the STEMdiff™ Pancreatic Progenitor Kit?

DEFINED. Serum-free and defined formulation.

ROBUST. Reproducible differentiation of multiple human ES and iPS cell lines.

EFFICIENT. Greater than 65% PDX-1$^+$/NKX6.1$^+$ cells in differentiated cultures.

FUNCTIONAL. Pancreatic progenitors capable of differentiating toward insulin-producing β-cells or other endocrine and exocrine pancreatic cell fates.

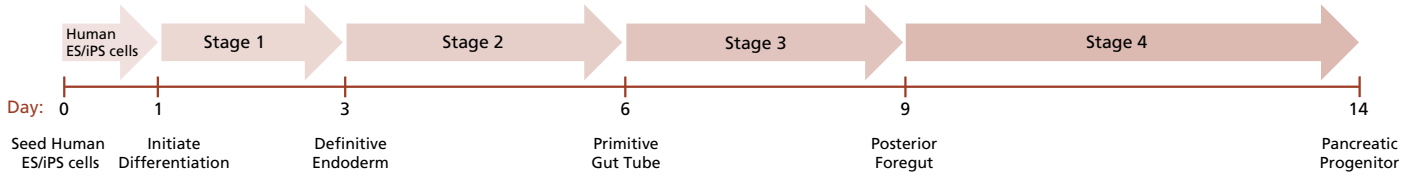

Figure 1. Schematic of Differentiation Protocol and Timeline

The STEMdiff™ Pancreatic Progenitor Kit can be used for the entire differentiation protocol from hPSCs to pancreatic progenitor cells. The protocol involves four stages of hPSC differentiation allowing for flexibility in the workflow: generate definitive endoderm on Day 3, primitive gut tube on Day 6, posterior foregut on Day 9 and pancreatic progenitor cells on Day 14. Transition between stages is achieved by simply changing the medium using components provided in the kit.

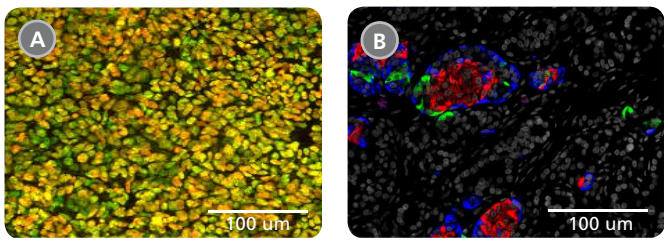

Figure 2. Pancreatic Progenitor Cells can Mature into Islet-Like Cells

(A) Representative image of PDX-1 (green) and NKX6.1 (red) immunoreactivity in pancreatic progenitor cells at the end of Stage 4. Yellow staining indicates co-expression of both markers in the majority of cells as is observed in the developing human pancreas.[1] **(B)** Stage 4 cells were transplanted under the kidney capsule of immunodeficient mice and allowed to engraft and mature over 24 weeks. Representative image showing insulin (red), glucagon (green) and somatostatin (blue) immunoreactivity in the matured graft. Nuclei were stained with DAPI (gray). Data in **(B)** are from the laboratory of Dr. Timothy J. Kieffer (University of British Columbia, Vancouver, Canada).

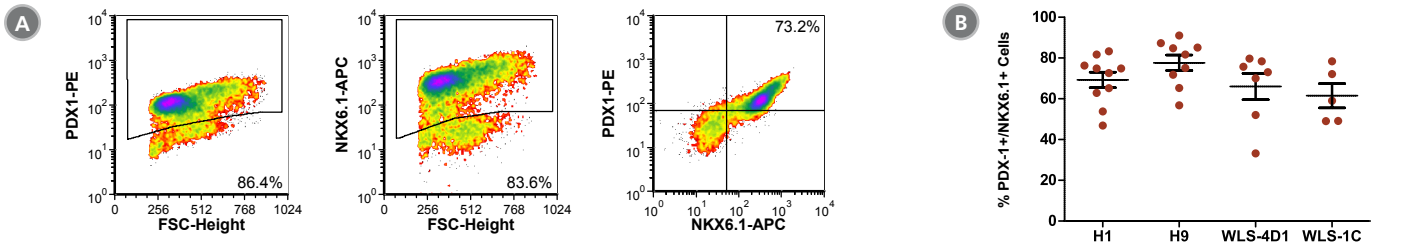

Figure 3. The STEMdiff™ Pancreatic Progenitor Kit Functions Efficiently Across Multiple hPSC Lines

n = 5-10 per cell line

PDX-1 and NKX6.1 expression measured in pancreatic progenitor cells derived from four different hPSC lines (H1, H9, WLS-4D1 and WLS-1C) at the end of Stage 4. **(A)** Representative flow cytometry plots show PDX-1 and NKX6.1 co-expression in differentiated H9 cells. **(B)** Quantitative data for PDX-1/NKX6.1 co-expression in two human ES (H1 and H9) and two human iPS (WLS-4D1 and WLS-1C) cell lines (n = 5-10 per cell line). Data are plotted as individual points representing the mean of duplicates within a single experiment. The horizontal line represents the mean of all experiments, with error bars indicating the standard error of the mean (SEM). The average efficiency of pancreatic progenitor differentiation ranges from 61.5% to 77.7% depending on the cell line.

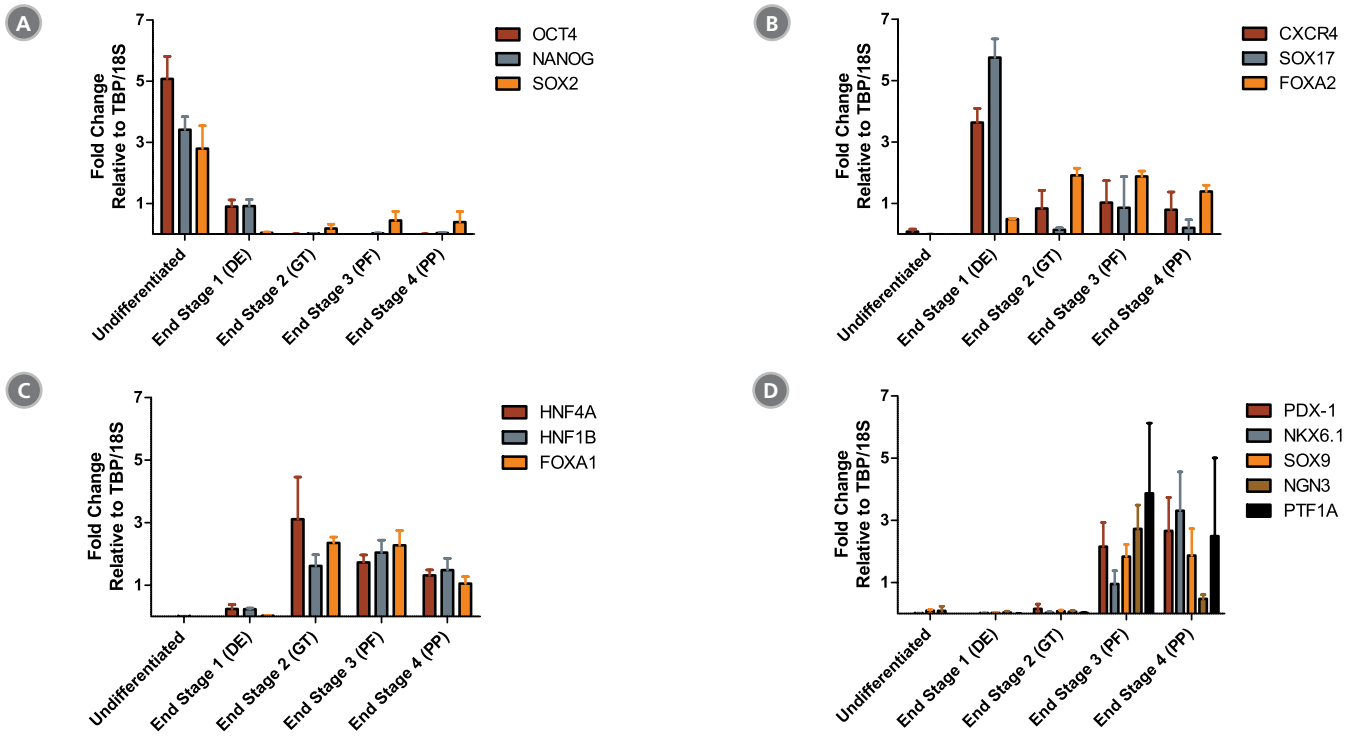

Figure 4. Gene Expression Profile is Indicative of Consistent Transition of Definitive Endoderm to Pancreatic Progenitor Cells

Gene expression profile at the end of each stage of differentiation for key markers of **(A)** the pluripotent state, **(B)** definitive endoderm, **(C)** primitive gut tube and posterior foregut, and **(D)** pancreatic progenitor cells. Expression was normalized to 18S ribosomal RNA and TATA Binding Protein (TBP). Data are the mean ± SEM for 3 - 5 experiments. Expression pattern is consistent with published data.[2]

For a complete list of related products, including specialized cell culture and storage media, matrices, antibodies, cytokines and small molecules, visit **www.stemcell.com/DEworkflow** or contact us at **techsupport@stemcell.com**.

References

1. Riedel M et al. (2012) Immunohistochemical characterization of cells co-producing insulin and glucagon in the developing human pancreas. Diabetologia 55(2):372-81.
2. Rezania A et al. (2014) Reversal of diabetes with insulin-producing cells derived in vitro from human pluripotent stem cells. Nat Biotechnol 32(11):1121-33.