

Supplementary Table 1: Combinations of small molecules for mouse differentiation experiments

Experimental condition	Small molecule source and working concentration	Biological relevance to differentiation protocol (references)
01	100mM sodium butyrate (Sigma)	Inhibits histone deacetylase (HDAC) activity, resulting in a state of histone hyperacetylation that alters chromatin structure and function, which can have various effects on gene expression and cell differentiation ^{56; 57}
02	100mM nicotinamide (Sigma)	Has been shown to induce pancreatic differentiation and increase proinsulin biosynthesis in islets ⁵⁸ , and increase the mitotic index of β -cells after pancreatectomy ⁵⁹⁻⁶¹
03	500ng.mL ⁻¹ activin A (Sigma)	A member of the transforming growth factor beta (TGF- β) superfamily that activates Smad2-mediated intracellular signaling to contribute to specificity of definitive endoderm in embryonic stem cells in culture ⁶²
04	500ng.mL ⁻¹ FGF2 (Sigma)	Involved in many biological processes including angiogenesis, embryonic

		development, and wound healing. It has shown to promote the differentiation of adipose-derived cells ⁴² and loss of FGF signaling has been implicated in β -cell loss and the development of diabetes ⁴³
05	100 μ M 5-azacitidine (Sigma)	Inhibits DNA methyltransferase activity which results in a state of DNA hypomethylation, which results in a non-specific increase in gene expression. This increased gene expression has been shown to promote the acquisition of a differentiated gene signature in mesenchymal cell populations ⁶³
06	1 μ M exendin-4 (Sigma)	Glucagon-Like Peptide-1 (GLP-1) receptor agonist that promotes the differentiation of pancreatic progenitor populations (such as ductal progenitor cells), and increases proliferation and maturation in beta cells during development ^{47; 48}
07	1 μ M exendin-(9-39) (Sigma)	A truncated version of exendin-4 that acts as a potent competitive antagonist at the GLP-1 receptor ^{49; 50}

Supplementary Table 2: TaqMan quantitative real time PCR assays and antibodies used in this study.

Product	Manufacturer	Catalogue Number
20X AOD probe/primer mix		
18s – 18S ribosomal RNA	Applied Biosystems	Hs99999901_s1
ACAN – aggrecan	Applied Biosystems	Hs00153936_m1
ADIPOQ – adiponectin, C1Q and collagen domain containing	Applied Biosystems	Hs00605917_M1
ADIPOR1 – adiponectin receptor 1	Applied Biosystems	Hs01114951_m1
ADIPOR2 – adiponectin receptor 2	Applied Biosystems	Hs00226105_m1
ADRB1 – adrenoceptor beta 1	Applied Biosystems	Hs02330048_s1
BGLAP – bone gamma-carboxyglutamate (gla) protein	Applied Biosystems	Hs01587814_g1
CD44 – CD44 molecule (Indian blood group)	Applied Biosystems	Hs01075861_m1
CFD – complement factor D (adipsin)	Applied Biosystems	Hs00157263_m1
CLDN4 – claudin 4	Applied Biosystems	Hs00533616_s1
DLK1 – delta-like 1 homolog (Drosophila)	Applied Biosystems	Hs00171584_m1
FGF2 – fibroblast growth factor 2 (basic)	Applied Biosystems	Hs00266645_m1
FN1 – fibronectin 1	Applied Biosystems	Hs00365052_m1
FOXA1 – forkhead box A1	Applied Biosystems	Hs00270129_m1
GAPDH – glyceraldehyde-3-phosphate dehydrogenase (Human)	Applied Biosystems	Hs99999905_m1
Gapdh – glyceraldehyde-3-phosphate dehydrogenase (Mouse)	Applied Biosystems	Mm03302249_g1
GCG – glucagon	Applied Biosystems	Hs00174967_m1
GCK - glucokinase	Applied Biosystems	Hs01564555_m1
Glut 1 – Glucose Transporter 1	Applied Biosystems	Hs00892681_m1
Glut 2 - Glucose Transporter 2	Applied Biosystems	Hs00165775_m1
HES1 – hairy and enhancer of split 1, (Drosophila)	Applied Biosystems	Hs00172878_m1
INS – insulin	Applied Biosystems	Hs00355773_m1
Ins1 – insulin 1 (Mouse)	Applied Biosystems	Mm01950294_s1
Ins2 – insulin 2 (Mouse)	Applied Biosystems	Mm00731595_gH

INSR – insulin receptor	Applied Biosystems	Hs00961554_m1
ITGA6 – integrin, alpha 6	Applied Biosystems	Hs01041011_m1
ITGAV – integrin, alpha V	Applied Biosystems	Hs00233808_m1
LEP – leptin	Applied Biosystems	Hs00174877_M1
MAFA – v-maf musculoaponeurotic fibrosarcoma oncogene homolog A	Applied Biosystems	Hs01651425_s1
MYC – v-myc myelocytomatosis viral oncogene homolog	Applied Biosystems	Hs00153408_m1
NANOG – nanog homeobox	Applied Biosystems	Hs02387400_g1
NGN3 – neurogenin 3	Applied Biosystems	Hs00360700_g1
PDX1 – pancreatic and duodenal homeobox 1	Applied Biosystems	Hs00236830_m1
Pdx1 – pancreatic and duodenal homeobox 1 (Mouse)	Applied Biosystems	Mm00435565_m1
POU5F1 – POU class 5 homeobox 1	Applied Biosystems	Hs00999632_g1
PPARA – peroxisome proliferator-activated receptor alpha	Applied Biosystems	Hs00947539_m1
PPARG – peroxisome proliferator-activated receptor gamma	Applied Biosystems	Hs01115513_m1
SMAD2 – SMAD family member 2	Applied Biosystems	Hs00183425_m1
SMAD3 – SMAD family member 3	Applied Biosystems	Hs00969210_m1
SMA – Smooth muscle actin	Applied Biosystems	Hs00426835_g1
SNAI1 – snail homolog 1 (Drosophila)	Applied Biosystems	Hs00195591_m1
SOX1 – SRY (sex determining region Y)-box 1	Applied Biosystems	Hs01057642_s1
SOX17 – SRY (sex determining region Y)-boX 17	Applied Biosystems	Hs00751752_s1
SOX2 – SRY (sex determining region Y)-box 2	Applied Biosystems	Hs00415716_m1
SOX7 – SRY (sex determining region Y)-box 7	Applied Biosystems	Hs00846731_s1
SST – somatostatin	Applied Biosystems	Hs00174949_m1
Sst – somatostatin (Mouse)	Applied Biosystems	Mm00436671_m1
TERT – telomerase reverse transcriptase	Applied Biosystems	Hs00972656_m1
THY1 – Thy-1 cell surface antigen	Applied Biosystems	Hs00264235_s1
VIM – vimentin	Applied Biosystems	Hs00185584_m1
Visfatin	Applied Biosystems	Hs00237184_M1
WNT3A – wingless-related MMTV integration site 3A	Applied Biosystems	Hs00263977_m1

ChIP Antibodies		
Anti-dimethyl Histone H3 (Lys4) Antibody	Millipore	05-684
Anti-dimethyl-Histone H3 (Lys9) Antibody	Millipore	07-441
Anti-acetyl-Histone H3 Antibody	Millipore	06-599
Normal rabbit IgG	Millipore	NI01-100UG
Flow cytometry antibodies		
CD29 PE-conjugated anti-human for flow cytometry	BD Biosciences	555443
CD31 FITC-conjugated anti-human for flow cytometry	BD Biosciences	555445
CD34 FITC-conjugated anti-human for flow cytometry	BD Biosciences	555821
CD44 PE-conjugated anti-human for flow cytometry	BD Biosciences	550989
CD45 FITC-conjugated anti-human for flow cytometry	BD Biosciences	555488
CD73 FITC-conjugated anti-human for flow cytometry	BD Biosciences	561254
CD90 PE-conjugated anti-human for flow cytometry	BD Biosciences	562385
CD105 PE-conjugated anti-human for flow cytometry	BD Biosciences	560839
Immunocytochemistry primary antibodies		
Human STRO-1 MAb (Clone STRO-1), Mouse IgM	R&D Systems	MAB1038
Leptin Polyclonal Antibody	Pierce	PA1-051
Monoclonal Mouse Anti-Vimentin, Clone V9	Dako	M0725
Polyclonal Guinea Pig Anti-Insulin	Dako	A0564
Rabbit Anti PPAR Gamma, Polyclonal IgG	Ab Serotec	AHP1461
Immunocytochemistry secondary antibodies		
Alexa Fluor® 488 goat anti-guinea pig IgG (H+L)	Molecular Probes	A-11073
Alexa Fluor® 488 goat anti-rabbit IgG (H+L)	Molecular Probes	A-11070
Alexa Fluor® 546 goat anti-mouse IgG (H+L)	Molecular Probes	A-11018

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