

Extended Data Table 5 | Primers used in this study

Extended Data Table 5.1 | qRT-PCR primers (differentiation and oscillation)

Gene	Forward Primer Sequence	Reverse Primer Sequence
hALX4	ATGAATGCTGAGACTTGCCTC	GGGAAATGCCCTAAAAGGCG
hAMOTL2	CCTGGGACCAGATGGTCAAT	GCCACTCTCAGCCATTTAG
hARHGAP24	TCGGGAACCCACAAATGTT	GTGCTGGCCTAACTCTCCAG
hAXIN2	GTATCGTCTGCGGGTCTTCC	CGAGCTCACACTCAATTCGC
hBCORL1	AGAGGCTGAAGCTTTCCTCG	CACCTGCCTGTAGAACTCGG
hT	CACTGCATCTTTTCGGGACCT	GACATCGTGGACAGCCAGTA
hCXXC5	TCAGTGAGCCCCTCAACAAG	TTGTCAGCAGACTCTCCGC
hDACT1	CTGAAGAAGCGGGGGCTTA	ACAAAGGTTTTTTCGGGGTG
hDKK1	GCACCTTGATGGGTATTCCA	GCACAACACAATCCTGAGGC
hDLL1	GGTCCTGCACGAGGTTATAGT	AACACCAACAAGAAGGCGGAC
hDMRT2	TCTCGGTGAATGAACCACTGT	GAGAGACACGAGTGATGGCA
hDUSP5	TGCCTACCCACTCAACAGTC	CCGATTCTCCATCCCAGTTT
hFGF18	TTTCATGAAGCGCTACCCCA	CTTGGTCACCGTCGTGTACT
hHES7	CTCGGATCTACCGCTTGG	TGCTACTTGTCGGTTTTCCG
hHK2	GCCCCGACAGAAGACATTAGA	GCTCAGACCTCGCTCCATTT
hHOXA5	CAATCCTCCTTCTGCGGGTC	CCTACACGCGCTACCAGAC
hHOXD1	CACCTACCCCAAGTCCGTCT	TTTCATCCACTCGAACGTGCT
hJADE1	GGCTGCCTGAGGAAGTAGTG	CCGCTTGGCTAGATTGTCCT
hKDM6B	GTCCATGAAGCACTGCCAGGT	GTTGCAGTAGTAGGCTGGCTC
hLFNG	GCCTGCTTGAGGAAGGATT	AGAAAGGCACCTACGCATCG
Luciferase	CGAGGCTACAAACGCTCTCA	TTGATCAGGCTCTTCAGCCG
hMAML3	CCAGACATGACCATTGGCCT	AGTCGTGGATGCTAACACGG
hMEOX1	CTCTTGCCCTTTTTGGGGTG	GAGGGAGGTCAACGTGAGTT
hMESP1	CGTCAGTTGTCCCTTGTCACTT	GCTGGCTCTGTTGGAGACCT
hMESP2	GGCTTCCCTCTTTCCATCCA	GGAGCCTTGGCTAAAGGAGA
hMIXL1	GGTACCCCGACATCCACTTG	ACCTGGAAGAGGGGAGAAAAT
hMSGN1	CTGCACACCCTCCGGAATTA	AGGAGGTCTGTGAGTTCCCC
hNOTCH1	CCAGTCGGAGACGTTGGAAT	TACTCCTCGCCTGTGGACAA
hPAX1	CGAAGGCACCGCTTACTCTC	AAGGCAGGTTTCTCTAGCCC
hPAX9	CACAACTGTGACATTCCGGC	GCCGTGACAGAATGACTACCT
hPLEKHG2	GGCTCTTAGACATTCAGGGC	AAGACTCCAACCTGGCAACG
hPRICKLE2	AGCTCGATCGCTTGTGACGTA	TGATTGGTGTTCCACCTGCT
hPRRX1	AGGCTTTGGAGCGTGTCTTT	GTTACCTGCACTCTCGCCTC
hRHOU	TCAAAGCCGCTCCTACATC	CTGTTGCTGAGTGTCCGAGT
hSMAD3	TGAAACACACGAGCAAACCC	AAAGTGGGGCCAAAGGGTAA
hSPRY4	CCTGCACCAAACACATGCAC	ATGCAAGGAGTGTGCATCCC
hTBX6	GCGCGGTGTATGGTAGAGG	CTACTCGGCTGCATTTCTGG
hTCF15	CCTCCTTCTCCAGGGTCCAG	CAGCTGCTTGAAGGTGAGGG
hTEAD4	GGCACCATTACCTCCAACGA	CCCTCTGCGTCATTGTGAT
hUNCX	GGAGAAGGCGTTCAACGAGA	GGAACCAGACCTGAACTCGG

Extended Data Table 5.2 | qRT-PCR primers (iPSC quality control)

Gene	TaqMan Assay ID	Probe label
hOCT3/4	Hs00999634_gH	FAM/MGB
hNANOG	Hs02387400_g1	FAM/MGB

Gene	Forward Primer Sequence	Reverse Primer Sequence	Probe Sequence	Probe label
GAPDH	TGCACCACCAACTGCTTAGC	TCTTCTGGGTGGCAGTGATG	ACTCATGACCACAGTCCA	VIC/MGB
cmCAG	GGCTCTGACTGACCGCGTTA	CAGAAAAGAAACAAGCCGTCATT	TGTAATTAGCGCTTGTT	FAM/MGB

Extended Data Table 5.3 | Exon genotyping primers

Gene	Exon no.	ID# /Name	Sequence
DLL3	1, 2	dna2235	CGACCACAGACGGAATCTC
		dna2236	CCCCAGTGTGTAGAGTTTAGAG
	3	dna2237	TGAACTCTGGCCTTCATTGAG
		dna2238	CTACATCCAGTACCAGGGACA
	4	dna2239	CTCCGTATGCATCCATGTTCCG
		dna2240	GTACCCTGAAGAGGGTGAGTG
	5	dna2241	GTACCATCTAGTCCCGATGATT
		dna2242	TAATCCTACTTCAAGGCCCCA
	6	dna2243	AGTGTAGACAGAAGCGAGCA
		dna2244	ATGAGATAGGGAATGTCTCCTTG
	7	dna2245	GATGACAGAGCTGGGAAACAG
		dna2246	ATCACAAAGGGGAACCCAAAA
	8	dna2247	GGTTCCCTTTGTGATGGGTA
		dna2248	ACATCAAATACAAAGCATTGAGCC
HES7	1	dna2699	CAGAAAGCTGCAATTCTGGAG
		dna2700	ACAGCCAGAGTGGAGCAA
	2, 3, 4	dna2227	GCGAGCTACAGAACTGATCT
dna2230		TGGCAGAACAGATAAACGAGA	
MESP2	1, 2	dna2231	TCGCACCTTTGGTCAACATAA
		dna2234	GAGAAGGAAAGAGCAGCAGAA
LFNG	v3-1	dna2960	TCTCTCTGCAAATCCTTCCCA
		dna2961	GGCTGGAGATAAAGAGAAGCC
	v3-2	dna2962	AAGACTTTCCAGAAGTCCCCT
		dna2963	CATGTCAGTGGGATGGGATAC
	v4	dna2964	CATGGGAGACTTGTCACTTGG
		dna2965	CCCCTCGGAGTTATGTTACAG
	1	dna2966	CCACCCAGTTTGCAAGG
		dna2967	ATCCAGGACTCTGGAGCTG
	2, 3, 4, 5	dna2968	CGAGTGGGAAACCAAGGC
		dna2969	CTCTGAAACCCAGAGGGAAGT
	6, 7	dna2253	CCTCTCCCTGAGGAGTGC
		dna2254	TAGAGTCATGCCGCTTAGAGA
	v3-3	dna2970	CGCTGAGCTACGGTATGTTTG
		dna2971	CCTAACAGAATTGCCCTCGG

Extended Data Table 5.4 | Oligos for sgRNA cloning

Gene	Target	Name	Sequence
MESP2	KO1	MESP2-S-KO1-sgRNA	caccgTGGCCGGCCGGCGCCAAGGA
		MESP2-AS-KO1-sgRNA	aaacTCCTTGGCGCCGGCCGGCCAc
	KO2	MESP2-S-KO2-sgRNA	caccgACGCCCAGACGAGCGCGCAC
		MESP2-AS-KO2-sgRNA	aaacGTGCGCGCTCGTCTGGGCGTc
	c.307T	MESP2-c307T-Xs	caccgAAAGCGGCGCAACTaGTGCA
		MESP2-c307T-Xas2	aaacTGCACtAGTTGCGCCGCTTtc
c.256delGCCA	MESP2-c256del4-Xs	caccgGACAGCGGCAGAGCGCGAGC	
	MESP2-c256del4-Xas	aaacGCTCGCGCTCTGCCGCTGTc	
HES7	KO1	HES7-S-KO1-sgRNA	caccGCAGATGCTCAAGCCGCTTG
		HES7-AS-KO1-sgRNA	aaacCAAGCGGCTTGAGCATCTGC
	KO2	HES7-S-KO2-sgRNA	caccgTGCTGCTGCTGGAGCGGACC
		HES7-AS-KO2-sgRNA	aaacGGTCCGCTCCAGCAGCAGAc
DLL3	KO1	DLL3-S-KO1-sgRNA	caccgCGTCTCGAGCGGTGCGCAG
		DLL3-AS-KO1-sgRNA	aaacCTGCGCACCGCTCGAGGACGc
	KO2	DLL3-S-KO2-sgRNA	caccgCGGTGAATGCCGATGCCTAG
		DLL3-AS-KO2-sgRNA	aaacCTAGGCATCGGCATTACCGc
LFNG	KO2	LFNG-S-KO2-sgRNA	caccgCACACGCGGGACGTCTACGT
		LFNG-AS-KO2-sgRNA	aaacACGTAGACGTCCCGCGTGTGc

Extended Data Table 5.5 | MhAX InFusion primers

Gene	Name	Sequence
MESP2	MESP2-u51-A	GCGAATTGGGTACctcgcacctttggtcaacataa
	MESP2-u51-B	CTGCTCGAGAATtaGGGCACGGGCAGCTTGCCGGTGGccaggcgcagcgtct
	MESP2-u51-C	TACGGTACCATCGGGGCACGGGCAGCTTGCCGGTGGcgccggccggccaga
	MESP2-u51-D	TCATGGCCGGTACctcctggagtagataagctggg

Extended Data Table 5.6 | Genotyping primers

Gene	Target Site	Name	Sequence
MESP2	5' arm	MESP2-5'F	GTTTTGACACCTCTCTGCAAC
		pDestPT35-R2	AGCTTGGCGTAATCATGGTC
	Spanning	MESP2-5'F	GTTTTGACACCTCTCTGCAAC
		MESP2-Exon2-R	GAGAAGGAAAGAGCAGCAGAA
	3' arm	SV40-polyA-4	GGACAAACCACAAGTGAATGC
		MESP2-Exon2-R	GAGAAGGAAAGAGCAGCAGAA
	3' external probe	MESP2-Exon2-F	CATACCATGGCAACCAGCC
		MESP2-Exon2-R	GAGAAGGAAAGAGCAGCAGAA