Supplementary Methods

MAPC isolation and characterization

MAPCs were isolated from bone marrow of C57Bl/6 mice, Fisher or Sprague Dawley rats, humans (21, 22), or porcine (46) as described. For a detailed protocol refer to Breyers et al.(50). To prove that the cultured cells were MAPCs, cells were analyzed using Quantitative (Q)-RT-PCR for the expression of the ESC-specific transcription factors Oct3a/4 and Rex1. To demonstrate multipotency, cells were treated with VEGF-165 to induce differentiation to endothelium, which was demonstrated using Q-RT-PCR for Flt1, Flk1, CD31, vascular-endothelial (VE)-Cadherin, and von willebrand factor (vWF) (47). To induce hepatocyte like cells, MAPCs were treated with FGF4 and HGF, and tested for expression of hepatocyte nuclear factor (HNF)3−β, albumin and cytokeratin (CK)-18(48). To demonstrate neuroectodermal commitment, rat, mouse and human MAPCs were treated with FGF2, followed by FGF8 and Sonic Hedgehog (SHH) and tested for expression of Otx-1, glial fibrillary acidic protein (GFAP), and neurofilament (NF) 200 transcripts, as described (22). For swine MAPCs, cells were treated with FGF2, Nogin and Retinoic acid, followed by BDNF and GDNF (Zeng et al, Stem Cells, in press).

For rat MAPCs (rMAPCs): after subcloning at 10 cells/well, cells were expanded by plating at ~150 cells / cm^2 in EGF (Sigma, St. Louis MO), PDGF-BB (R&D Systems, Minneapolis, MN) and LIF (Esgro, Temecula, CA) containing medium supplemented with 2% FCS (Hyclone, Logan, UT), in 6% CO_2, 5 or 20% O_2 humidified air, and replating at ~150 cells / cm^2 every 2 days. Oct4 and Rex-1

levels were detectable at levels 1,000 fold lower than mouse ESCs. Cells used were multipotent and >70% diploid.

For mouse MAPCs (mMAPCs): after subcloning at 10 cells/well, cells were expanded by plating at ~150 cells / cm^2 in EGF, PDGF-BB and LIF containing medium supplemented with 2% FCS, in 6% CO_2, 5% O_2 humidified air, and replating at ~150 cells / cm^2 every 2 days. Oct4 and Rex-1 levels were detectable at levels 20-80% of mouse ESCs. Cells used were multipotent and >70% diploid.

For porcine MAPCs (pMAPCs): after subcloning at ~ 1 cell per well, cells were expanded by plating at ~500 cells/well in EGF and PDGF-BB containing medium supplemented with 2% FCS, in 6% CO_2, 20% O_2 humidified air, and replating at ~500 cells / cm^2 every 4 days. Oct4 mRNA transcripts were detectable, at 1-5% of human ECs. Cells used were multipotent and 100% diploid.

For human MAPCs (hMAPCs): after subcloning at ~ 10 cell per well, cells were expanded by plating at ~500 cells/well in EGF and PDGF-BB containing medium supplemented with 2% FCS, in 6% CO_2, 20% O_2 humidified air, and replating at ~500 cells / cm^2 every 4 days. Oct4 and Rex-1 were detectable at levels <1,000 fold that of human ECs. Cells used were multipotent and 100% diploid.

SUPPLEMENTARY TABLE

Table 1: **Primers used for RT-PCR and Real Time RT-PCR**

ƧMC-Rat	Sense	Antisense
Myocardin	CTGTGTGGAGTCCTCAGGTCAAACC	GATGTGTTGCGGGCTCTTCAG
SMαActin	CGCCATCAGGAACCTCGAGA	CAAAGCCCGCCTTACAGA
SM22	CCACAAACGACCAAGCCTTTT	CGGCTCATGCCATAGGATG
H1-Calponin	ACATCATTGGCCTACAGATG	CAAAGATCTGCCGCTTGGTG
Smoothelin-B	CCAGAGGCTCCTCTAACACTAAGAG	TTGGCTCTTGATTTTGGGTTGGCTG
SM-MHC	CAAGAGTTCCGGCAACGCTA	TCCATCCATGAAGCCTTTGG
SmLim	GTGCCAAGTGTGGGAAGAGT	TCCTTGACCATAGCCGAATC
GATA6	GTCTGGATGGAGCCACAGTT	ATCATCACCACCCGACCTAC
Collagen I	GGAGAGTACTGGATCGACCCTAAC	CTGACCTGTCTCCATGTTGCA
Collagen III	GAAAAAACCCTGCTCGGAATT	GGATCAACCCAGTATTCTCCACTCT
Tropo-Elastin	CCTAGGAGCCAGGCCATTC	CCACCTGGGTAGATAGGAGAAA
C_av1.2	TTACAGCAGATGGAGAATCC	TGGGGACTGCCTTTTCCTTA
Telokin	GACACCGCCTGAGTCCAACCTCCG	GACCCTGTTGAAGATTTCCTGCCACTG
γ-Actin	CAGGTCATCACGATTGGCAATG	ATGAATTCCAGCTGACTCCAT
ƧMC-Mouse		
SM-MHC	TGGACACCATGTCAGGGAAA	ATGGACACAAGTGCTAAGCAGTCT
SMαSMA	CGCTGTCAGGAACCCTGAGA	CGAAGCCGGCCTTACAGA
SM22	CCACAAACGACCAAGCCTTCT	CGGCTCATGCCGTAGGAT
Calponin	ACATCATTGGACTGCAGATG	CAAAGATCTGCCGCTTGGTG
SMC-Human		
SM22	GGCAGCTTGGCAGTGACC	TGGCTCTCTGTGAATTCCCTCT
SM-MHC	CAGGAGTTCCGCCAACGCTA	TCCCGTCCATGAAGCCTTTGG
Calponin	TTTTGAGGCCAACGACCTGT	TCCTTTCGTCTTCGCCATG
SMaActin	TCCCGTCCATGAAGCCTTTGG	CGAAAGCCGGCCTTACAGA
SMC-swine		
SM22	GGCAGCTTGGCAGTGACC	TGGCTCTCTGTGAATTCCCTCT
Calponin	TTTTGAGGCCAACGACCTGT	TCCTTTCGTCTTCGCCATG
GAPDH	CACTGAGCACCAGGTTGTGT	CCTGTTGCTGTAGCCAAATTC
SMaActin	TGCTCTGGGTTCGTCAGAGTC	CAGGCAAGTCACTGTGTGGC
Gata 6	TTTGCTGCAATCGTCTGAGT	GGAATTCAGACCAGGAAACG
Cardiac rat		
Nkx2.5	AGCCACGCGTGCTCTTCT	CAGGTACCGCTGTTGCTTGA
Tropinin-T	GTACCCTCCAAAATGCATCA	AGCAGCGTATTCGCAATGA
αMHC	CAGAACACCAGCCTCATCAA	TGCTCCTTCTTCAGCTCCTC
Ɛndothelial-Rat		
vWF	CCCACCGGATGGCTAGGTATT	GAGGCGGATCTGTTTGAGGTT
Flk1	CCAAGCTCAGCACACAAAAA	CCAACCACTCTGGGAACTGT
Flt1	CTGTGCGGAAATCTTCAAGTCA	CCTTGATCTCCTCTGTGGAGTTG
Tie2	AACCAACAGTGATGTCTGGTCCTAT	GCACGTCATGCCGCAGTA