

**Supplementary Table S1.** Media composition  
Starting medium (SM)

Reagent	Company	Catalog no.	Working Conc.
Advanced DMEM/F12	Thermo Fisher	12634028	1x
PS	Thermo Fisher	15140122	1x
GlutaMAX	Thermo Fisher	35050079	1x
HEPES	Thermo Fisher	15630080	1x
N2 supplement	Thermo Fisher	17502048	1
N-Acetylcysteine	Sigma-Aldrich	A9165	1 mM
[Leu15]-Gastrin I human	Sigma-Aldrich	G9145	10 nM
Recombinant human EGF	Peptotech	AF-100-15	50 ng/mL
Recombinant human HGF	Peptotech	100-39	25 ng/mL
B27 supplement w/o Vit A	Thermo Fisher	12587010	1x
A83-01	Tocris	2939	5 $\mu$ M
Nicotinamide	Sigma-Aldrich	N0636	10 mM
Forskolin	Sigma-Aldrich	F3917	10 $\mu$ M
Recombinant human R-spondin	R&D	4645-RS-025	1 $\mu$ g/mL
Recombinant human FGF10	Peptotech	100-26	100 ng/mL
<sup>a</sup> Recombinant Noggin	R&D	6057-NG	25 ng/mL
<sup>a</sup> Recombinant Wnt-3a	R&D	5036-WN	100 ng/mL
<sup>a</sup> Y-27632	Tocris	1254	10 $\mu$ M

<sup>a</sup>Use only for the first 3 days after generation.

**Supplementary Table S1.** Continued  
Growth medium (GM)

Reagent	Company	Catalog no.	Working Conc.
Advanced DMEM/F12	Thermo Fisher	12634028	1x
PS	Thermo Fisher	15140122	1x
GlutaMAX	Thermo Fisher	35050079	1x
HEPES	Thermo Fisher	15630080	1x
N2 supplement	Thermo Fisher	17502048	1
N-Acetylcysteine	Sigma-Aldrich	A9165	1 mM
[Leu15]-Gastrin I human	Sigma-Aldrich	G9145	10 nM
Recombinant human EGF	Peptotech	AF-100-15	50 ng/mL
Recombinant human HGF	Peptotech	100-39	25 ng/mL
B27 supplement w/o Vit A	Thermo Fisher	12587010	1x
A83-01	Tocris	2939	5 $\mu$ M
Nicotinamide	Sigma-Aldrich	N0636	10 mM
Forskolin	Sigma-Aldrich	F3917	10 $\mu$ M
Recombinant human FGF-basic	Peptotech	100-18B	10 ng/mL
Oncostatin M	R&D	295-OM	10 ng/mL
ITS	Thermo Fisher	41400045	1x
Dexamethasone	Sigma-Aldrich	D4902	100 nM

**Supplementary Table S1.** Continued  
Expansion medium (EM)

Reagent	Company	Catalog no.	Working Conc.
Advanced DMEM/F12	Thermo Fisher	12634028	1x
PS	Thermo Fisher	15140122	1x
GlutaMAX	Thermo Fisher	35050079	1x
HEPES	Thermo Fisher	15630080	1x
N2 supplement	Thermo Fisher	17502048	1
N-Acetylcysteine	Sigma-Aldrich	A9165	1 mM
[Leu15]-Gastrin I human	Sigma-Aldrich	G9145	10 nM
Recombinant human EGF	Peptotech	AF-100-15	50 ng/mL
Recombinant human HGF	Peptotech	100-39	25 ng/mL
B27 supplement w/o Vit A	Thermo Fisher	12587010	1x
A83-01	Tocris	2939	5 $\mu$ M
Nicotinamide	Sigma-Aldrich	N0636	10 mM
Forskolin	Sigma-Aldrich	F3917	10 $\mu$ M
Recombinant human R-spondin	R&D	4645-RS-025	1 $\mu$ g/mL
Recombinant human FGF10	Peptotech	100-26	100 ng/mL
Recombinant human BMP7	Peptotech	120-03	25 ng/mL

**Supplementary Table S1.** Continued  
Differentiation medium (DM)

Reagent	Company	Catalog no.	Working Conc.
Advanced DMEM/F12	Thermo Fisher	12634028	1x
PS	Thermo Fisher	15140122	1x
GlutaMAX	Thermo Fisher	35050079	1x
HEPES	Thermo Fisher	15630080	1x
N2 supplement	Thermo Fisher	17502048	1
N-Acetylcysteine	Sigma-Aldrich	A9165	1 mM
[Leu15]-Gastrin I human	Sigma-Aldrich	G9145	10 nM
Recombinant human EGF	Peptidech	AF-100-15	50 ng/mL
Recombinant human HGF	Peptidech	100-39	25 ng/mL
B27 supplement w Vit A	Thermo Fisher	17504044	1x
A83-01	Tocris	2939	0.5 $\mu$ M
Dexamethasone	Sigma-Aldrich	D4902	3 $\mu$ M
DAPT	Sigma-Aldrich	D5942	10 $\mu$ M
Recombinant human BMP7	Peptidech	120-03	25 ng/mL
Recombinant human FGF19	Peptidech	100-32	100 ng/mL

**Supplementary Table S2.** List of primers used in this study

Gene	Forewordsequence	Reverse sequence
<i>ACTB</i>	GGACTTCGAGCAAGAGATGG	AGCACTGTGTTGGCGTACAG
<i>ALB</i>	TTTATGCCCCGGAATCCTTT	AGTCTCTGTTGGCAGACGAA
<i>BSEP</i>	AGGGAGCTACCAGGATAGTTAAGG	TCGTGCACCAGGTAAGAAAGC
<i>CYP1A2</i>	GTTCAAGCACAGCAAGAAGG	CTCAGGCTTGGTCACAAGGT
<i>CYP2C9</i>	CAGAGACGACAAGCACAACCT	GTGGCTCCTGTCTTGCATGCA
<i>CYP2D6</i>	TGAAGGATGAGGCCGTCTGGGAGA	CAGTGGGCACCGAGAAGCTGAAGT
<i>CYP3A4</i>	CTTCATCCAATGGACTGCATAAAT	TCCAAGTATAAACTCTACACAGACAA
<i>HNF4A</i>	GGCCAAGTACATCCCAGCTTT	CAGCACCAGCTCGTCAAGG
<i>MDR1</i>	TTGCTGCTTACATTCAGGTTTCA	AGCCTATCTCTGTGCGCATT
<i>MRP2</i>	TGCAGCCTCCATAACCATGAG	GATGCCTGCCATTGGACCTA

**Supplementary Table S3.** List of antibodies used in this study

Name	Supplier	Cat no.
Anti-ALB	Bethyl laboratories	A80-129A-11
Anti-HNF4A	Cell signaling technology	3113s
Anti-MRP2	Enzo Life Sciences, Inc.	ALX-801-016
Anti-MRP4	abcam	ab15602