Supplementary Table 1 Summary of the original studies describing iMSC production in five categories of protocols, as indicated

REFERENCES	MS	EB	SD	PI	PL
Lian Q. et al. 2010[41]	X				
Giuliani M. et al. 2011[42]	X				
Ahfeldt T, et al. 2012[56]		X			
Chen YS et al. 2012*[57]		X		X	
L.G. Villa-Diaz et al. 2012[58]		X			
Liu Y. et al. 2012[43]	X				
Wei H. et al. 2012*[59]		X	X	X	
Shao K. et al. 2013[60]		X			
Zou L. et al. 2013[40]	X				
Frobel J. et al 2014[71]					X
Fukuta et al. 2014*[66]			X	X	
Hynes et al. 2014[45]	X				
Jeong J. et al. 2014*[46]	X	X		X	
Miao Q. et al. 2014[61]		X			
Tang M. et al. 2014[21]		X			
Hu GW. et al. 2015[47]	X				
Kang R. et al 2015[48]	X				
Luzzani C. et al. 2015[72]					X
Zhang J. et al. 2015[23]	X				
Zhao et al. 2015[67]				X	
Lian Q. et al. 2016[49]	X				
Ouchi T. et al. 2016[65]			X		
Gao WX et al. 2017[50]	X				
Sheyn D. et al. 2017[20]		X			
Eto S. et al 2018*[55]		X	X		
Nachlas ALY et al. 2018*[51]	X	X			
Wang D. et al. 2018[52]	X				
Wang LT et al. 2018[53]	X				
McGrath et al. 2019*[54]	X				X
Mitsuzawa S. et al. 2019[64]			X		
Karam M. et al. 2020[62]		X			
Huang X. et al. 2020[63]		X			
TOTAL	16/32	13/32	5/32	5/32	3/32

MS : MSC Switch, EB : Embryoid Bodies, SD: Specific Differentiation, PI: pathway inhibitor, PL: platelet lysate.

Supplementary Table 2 Culture medium, supplements, and coatings

1. Medium, 2. Supplements, 3. Coatings.

A. MSC Switch, B. EB, C. Specific Differentiation, D. Pathway Inhibitor, E. Platelet Lysate.

1A

	α-MEM	DMEM	DMEM/F12	HG-DMEM	KO DMEM	LG-DMEM
Lian Q. et al. 2010[41]					X	
Giuliani M. et al. 2011[42]			X			
Liu Y. et al. 2012[43]	X					
Zou L. et al. 2013[44]						X
Hynes et al. 2014[45]	X					
Jeong J. et al. 2014*[46]			X			
Hu GW. et al. 2015[47]						X
Kang R. et al 2015[48]						X
Zhang J. et al. 2015[23]						X
Lian Q. et al. 2016[49]		X			X	
Gao WX et al. 2017[50]	X			X		
Nachlas ALY et al. 2018*[51]					X	
Wang D. et al. 2018[52]	X			X		
Wang LT et al. 2018[53]						X
McGrath et al. 2019[54]	X				X	
TOTAL (15 references)	5/15	1/15	2/15	2/15	4/15	5/15

1B

	α-MEM	DMEM	DMEM/F12	HG-DMEM	IMDM	KO DMEM	LG-DMEM	MEF medium
Ahfeldt T, et al. 2012[56]		X						
Chen YS et al. 2012*[57]		X						
L.G. Villa-Diaz et al. 2012[58]	X							
Wei H. et al. 2012*[59]		X		X				
Shao K. et al. 2013[60]						X		
Jeong J. et al. 2014*[46]			X					
Miao Q. et al. 2014[61]		X						
Tang M. et al. 2014[]		X	X					X
Sheyn D. et al. 2017[21]		X			X			
Eto S. et al 2018*[55]	X		X					
Nachlas ALY et al. 2018*[51]						X		
Karam M. et al. 2020[62]							X	
Huang X. et al. 2020[63]	X							
TOTAL (13 references)	3/13	6/13	3/13	1/13	1/13	2/13	1/13	1/13

1C

	DMEM	HG-DMEM	STK2	DMEM/F12	α-MEM	Neurobasal medium	IMDM
Wei H. et al. 2012*[59]	X	X					
Fukuta et al. 2014*[66]			X		X		X
Ouchi T. et al. 2016[65]				X		X	
Eto S. et al 2018*[55]				X	X		
Mitsuzawa S. et al. 2019[64]	X						X
TOTAL	2/5	1/5	1/5	2/5	2/5	1/5	2/5

1D

	STK2	α-MEM	DMEM	KO DMEM	HG-DMEM	Ham's F12	IMDM
Chen YS et al. 2012*[57]			X				
Wei H. et al. 2012*[59]			X			X	
Fukuta et al. 2014*[66]	X	X				X	X
Jeong J. et al. 2014*[46]	X	X				X	X
Zhao Q. et al. 2015[67]				X	X		
TOTAL (5 references)	2/15	2/15	2/15	1/15	1/15	3/15	2/15

1E

	α-MEM	DMEM	KO DMEM
Frobel J. et al 2014[71]		X	
Luzzani C. et al. 2015[72]	X		
McGrath et al. 2019[54]			X
TOTAL (3 references)	1/3	1/3	1/3

2A

REFERENCES	AAP2	APM	B-merc	BSA	dexamethasone	EGF	FBS	FGF	HEPES	ITS	KOSR	L-Gluta	NEAA	PDGF	P/S	SB431542	sodium pyru
Lian Q. et al. 2010[41]						X		X			X			X			
Giuliani M. et al. 2011[42]			X				X	X				X	X		X		
Liu Y. et al. 2012[43]		X			X		X					X	X		X		
Zou L. et al. 2013[44]							X					X					
Hynes et al. 2014[45]	X						X		X			X	X		X		X
Jeong J. et al. 2014*[46]				X			X			X	X				X	X	
Hu GW. et al. 2015[47]							X					X					
Kang R. et al 2015[48]							X					X			X		
Zhang J. et al. 2015[23]							X					X	X		X		
Lian Q. et al. 2016[49]						X	X	X			X			X			
Gao WX et al. 2017[50]	X					X	X	X				X	X		X		X
Nachlas ALY et al. 2018*[51]			X				X					X	X		X		
Wang D. et al. 2018[52]	X					X	X	X				X	X		X		X
Wang LT et al. 2018[53]							X					X			X		
McGrath et al. 2019[54]							X	X				X	X				
TOTAL (15 references)	3/15	1/15	2/15	1/15	1/15	4/15	14/15	6/15	1/15	1/15	3/15	14/15	8/15	2/15	10/15	1/15	3/15

2B

	Activin A	BSA	B-merc	BMP4	CTK	FBS	FGF	gentami	ITS	KOSR	L-Gluta	LiCl	NEAA	P/S	PSA	RA	SB203580	SB431542	TGF-B1
Ahfeldt T, et al. 2012[56]						X	X				X								
Chen YS et al. 2012*[57]						X		X			X			X				X	
L.G. Villa-Diaz et al. 2012[58]						X	X				X		X						
Wei H. et al. 2012*[59]			X			X			X		X		X				X		
Shao K. et al. 2013[60]			X			X					X		X						
Jeong J. et al. 2014*[46]		X				X			X	X				X				X	
Miao Q. et al. 2014[61]						X													
Tang M. et al. 2014[21]			X			X				X	X		X	X					
Sheyn D. et al. 2017[20]			X			X				X	X		X	X	X				X
Eto S. et al 2018*[55]	X		X	X	X	X	X				X	X	X	X		X			
Nachlas ALY et al. 2018*[51]			X			X					X		X	X					
Karam M. et al. 2020[62]						X	X							X		X			
Huang X. et al. 2020[63]							X												
TOTAL (13 references)	1/13	1/13	6/13	1/13	1/13	12/13	5/13	1/13	2/13	3/13	9/13	1/13	7/13	7/13	1/13	2/13	1/13	2/13	1/13

2C

	Activin A	apo-tran	B-merc	BMP4	BSA	CHIR	CTK	EGF	FBS	FGF	Gem21 Neuro	insulin	ITS	LiCl	lipid conc	monothiog	NEAA	N2 sup	P/S	RA	SB203580	SB431542
Wei H. et al. 2012*[59]			X						X				X				X				X	
Fukuta et al. 2014*[66]		X			X	X			X			X			X	X			X			X
Ouchi T. et al. 2016[65]								X		X	X	X						X	X			
Eto S. et al 2018*[55]	X		X	X			X		X	X				X					X	X		
Mitsuzawa S. et al. 2019[64]		X			X	X			X	X		X			X	X			X			X
TOTAL (5 references)	1/5	2/5	2/5	1/5	2/5	2/5	1/5	1/5	4/5	3/5	1/5	3/5	1/5	1/5	2/5	2/5	1/5	1/5	4/5	1/5	1/5	2/5

2D

	apo-tran	BSA	B-merc	CHIR	EGF	FBS	FGF	gentami	insulin	ITS	L-Gluta	lipid conc	monothioglycerol	NEAA	P/S	SB 203580	SB431542
Chen YS et al. 2012*[57]						X		X			X				X		X
Wei H. et al. 2012*[59]			X			X				X	X			X		X	
Fukuta et al. 2014*[66]	X	X		X		X			X			X	X		X		X
Jeong J. et al. 2014*[46]		X				X				X					X		X
Zhao et al. 2015[67]			X		X		X				X			X	X		X
TOTAL (5 references)	1/5	2/5	2/5	1/5	1/5	4/5	1/5	1/5	1/5	1/5	3/5	1/5	1/5	2/5	4/5	1/5	4/5

2E

	B-merc	FBS	FGF	heparin	hPL	L-Gluta	NEAA	P/S
Frobel J. et al 2014[71]				X	X	X		X
Luzzani C. et al. 2015[72]		X		X	X			X
McGrath et al. 2019[54]	X	X	X	X	X	X	X	X
TOTAL (3 references)	1/3	2/3	1/3	3/3	3/3	2/3	1/3	3/3

3A

	Collagen	Gelatin	Matrigel	Ø
Lian Q. et al. 2010[41]		X		
Giuliani M. et al. 2011[42]				X
Liu Y. et al. 2012[43]	X			
Zou L. et al. 2013[44]				X
Hynes et al. 2014[45]		X		
Jeong J. et al. 2014*[46]			X	
Hu GW. et al. 2015[47]		X		
Kang R. et al 2015[48]		X		
Zhang J. et al. 2015[23]		X		
Lian Q. et al. 2016[49]		X		
Gao WX et al. 2017[50]		X		
Nachlas ALY et al. 2018*[51]		X		
Wang D. et al. 2018[52]		X		
Wang LT et al. 2018[53]				X
McGrath et al. 2019[54]		X		
TOTAL (15 references)	1/15	10/15	1/15	3/15

3B

	Collagen	Gelatin	Matrigel	poly-HEMA	Ø
Ahfeldt T, et al. 2012[56]		X			
Chen YS et al. 2012*[57]					X
L.G. Villa-Diaz et al. 2012[58]		X			
Wei H. et al. 2012*[59]					X
Shao K. et al. 2013[60]		X			
Jeong J. et al. 2014*[46]			X		
Miao Q. et al. 2014[61]					X
Tang M. et al. 2014[21]		X			
Sheyn D. et al. 2017[20]		X		X	
Eto S. et al 2018*[55]	X	X			
Nachlas ALY et al. 2018*[51]		X			
Karam M. et al. 2020[62]		X	X		
Huang X. et al. 2020[63]		X			
TOTAL (13 references)	1/13	9/13	2/13	1/13	3/13

3C

	Collagen	Fibronectin	Gelatin	Ø
Wei H. et al. 2012*[59]			X	
Fukuta et al. 2014*[66]		X		
Ouchi T. et al. 2016[65]				X
Eto S. et al 2018*[55]	X			
Mitsuzawa S. et al. 2019[64]		X		
TOTAL (5 references)	1/5	2/5	1/5	1/5

3D

	Fibronectin	Matrigel	Ø
Chen YS et al. 2012*[57]		X	
Wei H. et al. 2012*[59]			X
Fukuta et al. 2014*[66]	X		
Jeong J. et al. 2014*[46]			X
Zhao et al. 2015[67]		X	
TOTAL (5 references)	1/5	2/5	2/5

3E

	Gelatin	Matrigel
Frobel J. et al 2014[71]	X	X
Luzzani C. et al. 2015[72]		X
McGrath et al. 2019[54]	X	
TOTAL (3 references)	2/3	2/3

Supplementary Table 3 Cell type used to obtain iPSCs used in protocol studies to produce MSCs

Cell Type	Fraction	%	References
dermal fibroblast	12/25	40%	Lian Q. et al. 2010[41] L.G. Villa-Diaz et al. 2012[58] Wei H. et al. 2012[59] Zou L. et al. 2013[44] Miao Q. et al. 2014[61] Kang R. et al 2015[48] Ouchi T. et al. 2016[65] Sheyn D. et al. 2017[20] Eto S. et al 2018[55] McGrath et al. 2019[54]
PBMC	4/25	13%	Wang LT et al. 2018[53] Karam M. et al. 2020[62] Huang X. et al. 2020[63]
amniocyte	3/25	10%	Giuliani M. et al. 2011[42] Gao WX et al. 2017[50] Wang D. et al. 2018[52]
BM	3/25	10%	Frobel J. et al 2014[71] Tang M. et al. 2014[21] McGrath et al. 2019[54]
fetal endothelial	1/25	3%	Wang LT et al. 2018[53]
foreskin fibroblast	2/25	7%	Luzzani C. et al. 2015[72] Chen YS et al. 2012*[57]
lung fibroblast	1/25	3%	Chen YS et al. 2012*[57]
MSC	1/25	3%	Shao K. et al. 2013[60]
PGF	1/25	3%	Hynes et al. 2014[45]
PDL	1/25	3%	Hynes et al. 2014[45]
urine-cell	1/25	3%	Gao WX et al. 2017[50]

* Indicates studies using protocols in more than one category

Supplementary Table 4 iMSC cell surface markers

A: Positive markers. B: Negative markers.

A

REF	CD29	CD33	CD44	CD49(a)	CD49(d)	CD49(e)	CD49(f)	CD54	CD71	CD73	CD90	CD105	CD106	CD140 alpha	CD140(b)	CD144	CD146	CD166	CD172alpha	CD271	HLA-ABC	Sca1	αSMA+	Stro1
[89]																								
[90]																								
[17]			+							+	+	+					+	+						
[91]	+		+							+	+	+								+				
[19]										+	+	+												
[64]			+							+		+												
[92]			+	+		+				+		+						+						
[93]	+		+	+						+		+						+						
[94]																					+			
[95]			+							+	+	+						+						
[71]	+									+	+	+												
[41]			+	+		+				+		+						+						
[53]										+	+	+									+			
[96]	+										+													
[97]	+		+							+	+		+									+		
[45]										+	+	+	+				+	+						
[48]	+		+							+	+	+												
[67]			+							+	+	+						+						
[54]			+							+	+													
[58]										+	+	+						+						
[55]					+					+	+	+	+	+	+					+				
[72]	+			+	+	+	+			+	+	+						+	+	+				
[50]			+							+	+	+				+	+	+						
[66]			+							+		+												
[42]								+		+	+	+					+							
[43]										+	+	+					+	+						
[98]										+	+	+												
[99]			+							+	+	+									+			
[57]	+		+							+	+	+					+							
[62]	f		+							+	+	+												
[51]																								
[100]			+						+		+												+	
[61]			+	+		+				+		+						+						
[46]	+		+							+	+	+												
[47]	+	+								+	+	+												
[101]	+		+							+	+	+					+							
[102]	+		+							+	+	+		+								+		

[103]	+		+							+	+							+						
[104]																								
[60]										+	+	+												
[56]	+									+	+	+												
[11]	+		+							+		+												+
[49]	+									+	+													
[44]	+		+	+								+						+						
[59]										+	+	+												
[21]	+		+							+	+	+					+				+			
[20]	+		+							+		+						+			+			
[65]	+		+								+	+												

B

REF	CD3	CD4	CD11b	CD14	CD19	CD20	CD24	CD31	CD34	CD40	CD45	CD56	CD79a	CD80	CD86	CD117	CD133	CD309	HLA-DR	Oct3/4	Sox2	TRA-160	TRA-161	TRA181	TRA180	SSEA-4
[89]																										
[90]																										
[52]									-		-															
[91]									-		-	-														
[19]																										
[64]											-															
[92]									-		-						-									
[93]							-	-	-																	
[94]										-				-	-											
[95]							-	-																		
[71]				-				-	-		-															
[41]									-		-						-							-		
[53]	-		-	-	-				-		-								-							
[96]									-		-															
[97]			-					-			-															
[45]				-					-		-															
[48]			-	-				-	-		-								-							
[67]			-				-		-		-								-							
[54]																										
[58]								-	-		-															
[55]									-		-															
[72]			-	-	-				-		-		-					-	-							
[50]				-					-		-									-	-		-	-		
[66]											-															
[42]									-		-															
[43]									-		-															

[98]				-					-		-														
[93]	-			-					-	-	-	-		-	-				-						
[59]			-	-				-	-		-					-									
[62]				-	-				-		-														
[63]																									
[51]											-														
[100]									-		-						-								
[61]																									
[46]									-		-														
[47]									-		-						-		-						
[101]			-					-	-		-														
[102]									-		-								-						
[103]																									
[104]				-		-			-		-														
[60]				-				-	-		-														
[56]		-																							
[23]									-		-														
[49]									-		-													-	
[44]									-		-														
[59]																			-			-		-	-
[21]								-	-											-				-	
[20]																									
[65]																									

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