

# Multiparameter Flow Cytometric Analysis of Human Mesenchymal Stem Cells



Bone marrow–derived MSCs are phenotypically defined by the presence of cell surface markers in Table 1 and the absence of cell surface markers listed in Table 2.

**Table 1.** Positive markers of human bone marrow–derived mesenchymal stem cells available from BD Biosciences for use in multiparameter flow cytometric analysis.

Marker	Clone	Violet Laser (405 nm)				Blue Laser (488 nm)								Green Laser (532 nm) / Yellow-Green Laser (561 nm)				Red Laser (640 nm)				Unlabeled (Pure)	Biotin		
		1		2		1		2		3		4		5		1		2		3					
		448 nm	452 nm	491 nm	500 nm	519 nm	519 nm	578 nm	615 nm	667 nm	678 nm	695 nm	785 nm	578 nm	615 nm	667 nm	785 nm	660 nm	668 nm	719 nm	785 nm			785 nm	
		BD Horizon™ V450	Pacific Blue™	AmCyan	BD Horizon™ V500	FITC	Alexa Fluor® 488	PE	PE-Texas Red®	PE-Cy™5	PerCP	PerCP-Cy™5.5	PE-Cy™7	PE	PE-Texas Red®	PE-Cy5	PE-Cy7	APC	Alexa Fluor® 647	Alexa Fluor® 700	APC-Cy7	BD APC-H7			
CD10	HI10a					340925*		340921* 555375		555376			341092*	340921* 555375		555376	341092*	340923*						555373	
	W8E7					347503*																		347500*	
CD13	L138							347837*					338425*	347837*			338425*							347830*	
	WM15							555394						555394					557454					555393	
CD15	HI98					555401		555402				560828	560827	555402			560827	551376						555400	
	MMA	642917*				347423*																		559045 347420*	
CD29	MAR4							555443				559882		555443		559882		559883						555442	
	HUTS-21							556049						556049										556048	
CD44	515							550989						550989										550988	
	G44-26	561292				555478		555479				560531	560533	555479			560533	559942				560532	555476	555477	
	L178					347943*																	559046		
CD49d	9F10					560840		555503			559880			555503		559880		559881						555502	
	L25					340296*								340296*										340976*	
CD49e	IIA1							555617						555617										555615	555616
CD51	23C6					555505		550037						550037										555504	
CD54	HA58							555511			555512			555511		555512		559771						555510	559817
	LB-2							347977*						347977*										559047	
CD56	B159	560360					557699	555516			555517	560842	557747	555516		555517	557747	555518	557711	557919				555514	555515
	MY31							347747*						347747*										347740 559049	
	NCAM16.2					340410*		340363*					335791*	340363*			335791*	341025*						559043	
CD71	L01.1					347513*												341028*						347510	
	M-A712					555536		555537			551143			555537		551143		551374						555534	555535
CD73 <sup>1</sup>	AD2							550257						550257				560847						550256	
CD90 <sup>1</sup>	5E10					555595		555596			555597			555596		555597		559869						555593 550402	555594
CD105 <sup>1</sup>	266							560839				560819		560839										555690	
CD106	51-10C9					551146		555647			551148			555647		551148		551147						555645	
CD117	104D2							340529*				333944*	339195*	340529*			339195*	341096*							
	YB5.B8							555714			559879			555714		559879		550412						555713	
CD120a	MABTNFR1-B1																							550514	550900
CD120b	hTNFR-M1							552418						552418										551311	552477
CD166	3A6							559263						559263										559260	
CD271	C40-1457							557196				560834		557196					560326					557194	557195
CD309	89106							560494						560494					560495						

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<sup>1</sup>Minimal panel proposed by the Mesenchymal and Tissue Stem Cell Committee of the International Society for Cell Therapy (ISCT).  
\*RUO (GMP) status reagents.

# Multiparameter Flow Cytometric Analysis of Human Mesenchymal Stem Cells

**Table 2.** Negative markers of human bone marrow–derived mesenchymal stem cells available from BD Biosciences for use in multiparameter flow cytometric analysis.

		Violet Laser (405 nm)				Blue Laser (488 nm)								Green Laser (532 nm) / Yellow-Green Laser (561 nm)				Red Laser (640 nm)						
		1		2		1		2		3		4		5		1		2		3				
		448 nm	452 nm	491 nm	500 nm	519 nm	519 nm	578 nm	615 nm	667 nm	678 nm	695 nm	785 nm	578 nm	615 nm	667 nm	785 nm	660 nm	668 nm	719 nm	785 nm	785 nm		
Marker	Clone	BD Horizon™ V450	Pacific Blue™	AmCyan	BD Horizon™ V500	FITC	Alexa Fluor® 488	PE	PE-Texas Red®	PE-Cy5	PerCP	PerCP-Cy5.5	PE-Cy7	PE	PE-Texas Red®	PE-Cy5	PE-Cy7	APC	Alexa Fluor® 647	Alexa Fluor® 700	APC-Cy7	BD APC-H7	Unlabeled (Pure)	Biotin
CD11a	HI111					555383		555384		551131			561387	555384		551131	561387	559875					555382	
	G-25.2					347983*																		
	G43-25B					555379		555380						555380										555378
CD11b <sup>1</sup>	D12							347557*						347557*				340937*						
	ICRF44	560480	558123			557701	555388		555389				557743	555388	555389	557743	550019	557918	557754				555386	555387
CD14 <sup>1</sup>	M5E2		558121		561391	555397	557700	555398				550787	557742	555398			557742	555399	557923				555396	550376
	M $\psi$ P9	560349				347493*		347497*			340585*			347497*				340436*		333945*	560180	641394*	347490*	
CD19 <sup>1</sup>	4G7					347543*				347544*														347540
	HIB19	560353			561121	555412	557697	555413		555414		561295	560728	555413		555414	560728	555415	557921			560727	555410	555411
	SJ25C1	644491*		339190*		340409*		340364*			340421*	340951*	341093* 557835	340364*			341093* 557835	340437*			348794* 557791	560252 560177 641395*		
CD31	L133.1							340297*						340297*										
	M89D3						558068												558094					
	WM59					555445		555446						555446										555444
CD34 <sup>1</sup>	563							550761						550761										550760
	581					555821		555822		555823			560710	555822		555823	560710	555824						555820
	8G12					348053*		348057*				340430*	347203*	348791*	348057*			348791*	340441*					348050*
CD45 <sup>1</sup>	2D1	642275*		339192*		347463*						347464*	340953*								348795* 557833	560178 641399*	347460	
	HI30	560368 560367			560777	555482		555483		555484			557748	555483		555484	557748	555485		560566			555480	555481
CD79a <sup>1</sup>	HM47						340579* 555935				341643*		340579* 555935					340587* 551134					555934	
HLA-DR <sup>1</sup>	TU36					555560		555561		551375				555561		551375		559868						555559
	L243 (G46-6)	642276* 561359			561224	347363* 555811		347367* 555812		555813	347364*	339194* 560652	335795* 560651	347367* 555812		555813	335795*	340549* 559866		560743	335796*	641393* 561358	347360 555810	347361*

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<sup>1</sup>Minimal panel proposed by the Mesenchymal and Tissue Stem Cell Committee of the International Society for Cell Therapy (ISCT).  
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