Electronic Supplementary Material (ESI) for Analytical Methods.

Electronic supplementary information for the research article "Label-free mesenchymal stem cell enrichment from bone marrow samples by inertial microfluidics"

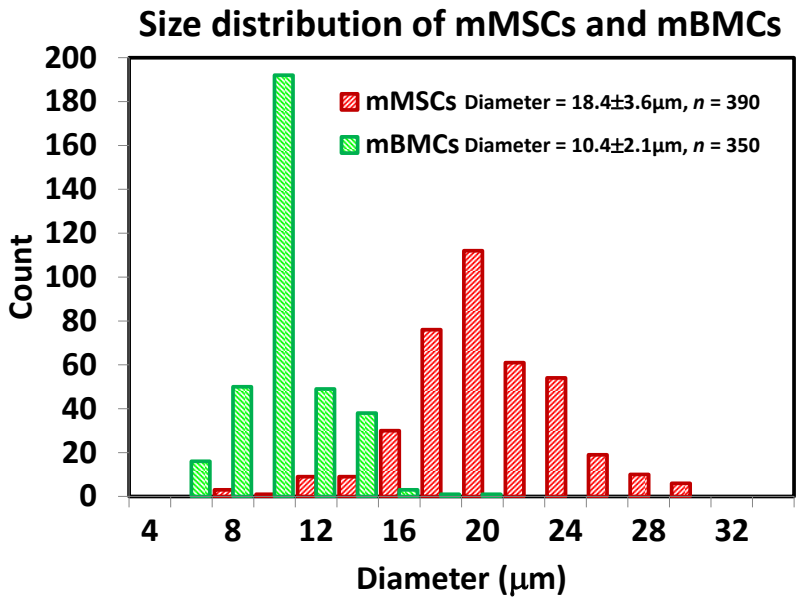

Figure S1. Size distribution before spiral inertial microfluidic sorting (a) mouse mesenchymal stem cells (mMSCs) and (b) mouse bone marrow cells (mBMCs).

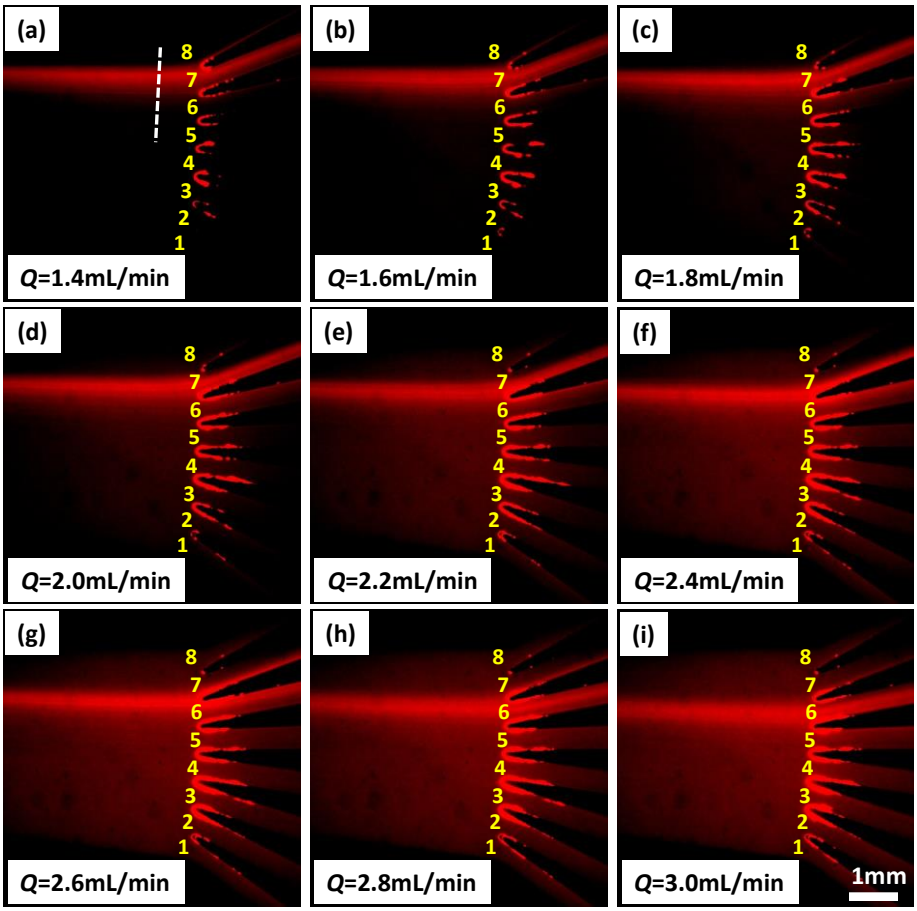

Figure S2. Cell trajectories of mMSCs near the outlets of the spiral inertial microfluidic sorter at different volume flow rates (a) 1.4 mL/min; (b) 1.6 mL/min; (c) 1.8 mL/min; (d) 2.0 mL/min; (e) 2.2 mL/min; (f) 2.4 mL/min; (g) 2.6 mL/min; (h) 2.8 mL/min; (i) 3.0 mL/min. Cells are fluorescently labeled to facilitate visualization. The increase in fluorescence intensity by collection of mMSCs near the outlets can be readily observed.

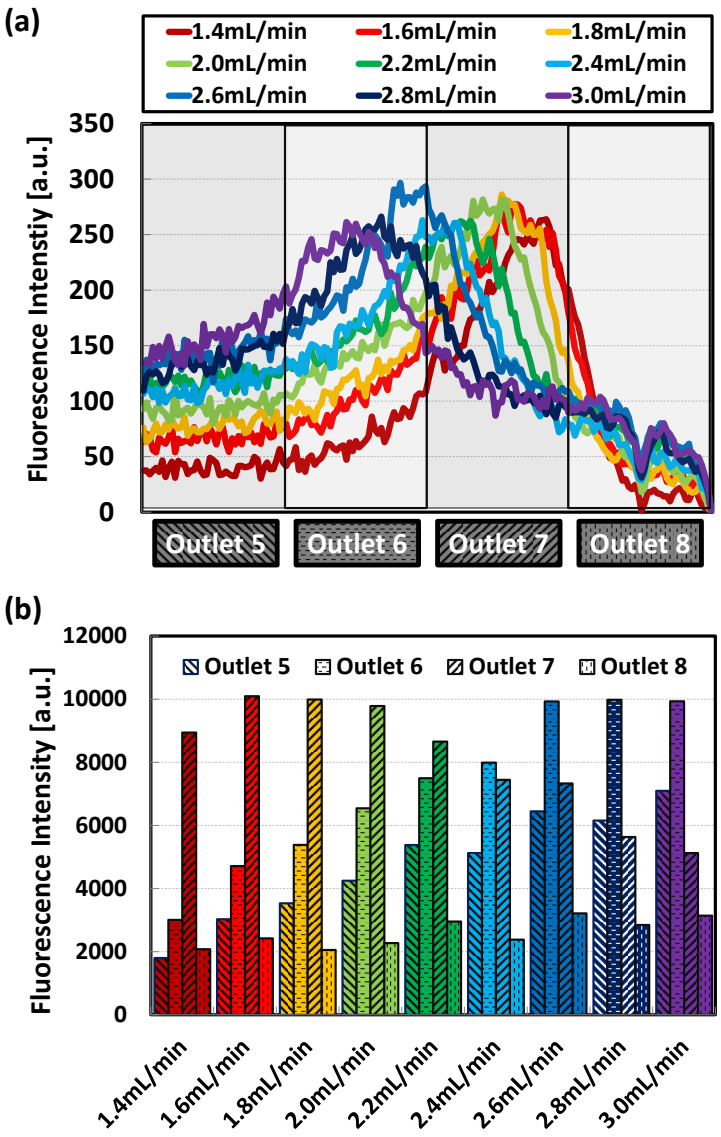

Figure S3. Analysis of cell trajectories of mMSCs in the spiral inertial microfluidic sorter (a) Line scan of the fluorescence signal in the cross-stream direction at different volume flow rates and (b) integral of fluorescence signal (area under the line scan) corresponding to each outlet.

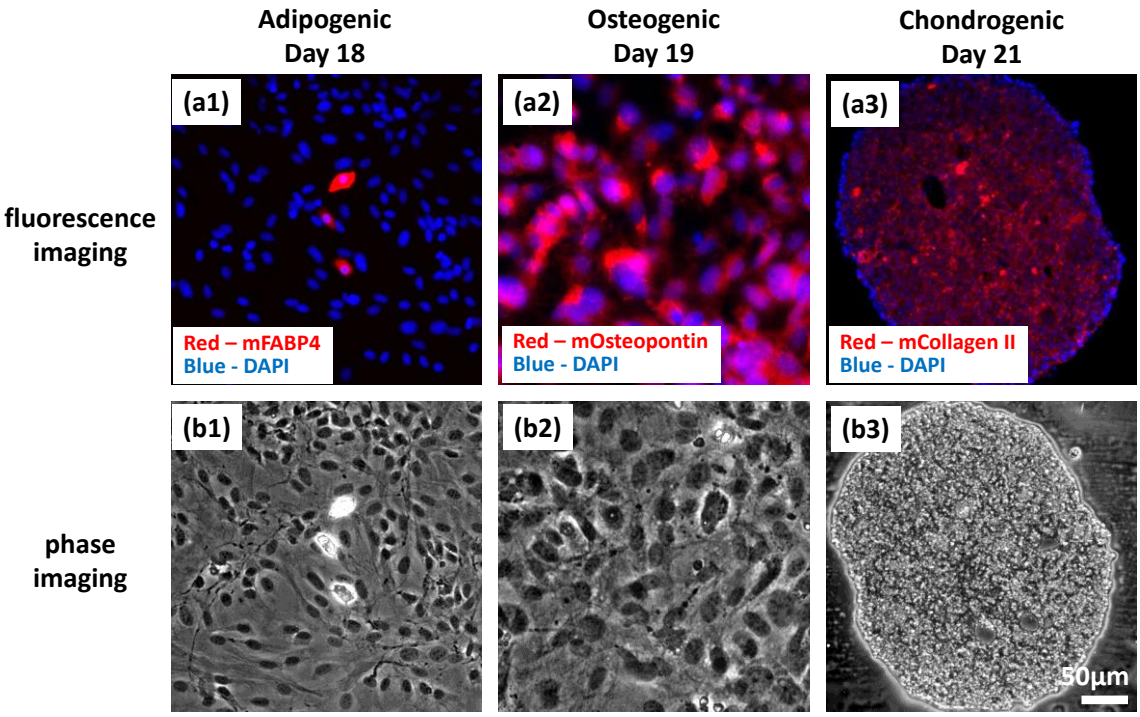

Figure S4. Control experiments for multi-potency differentiation.

Table S1. Sorting performance summary of the spiral inertial microfluidic sorter on mMSCs and mBMCs mixtures.

	Purity	**Recovery**		**Enrichment**
	mMSCs/(mBMCs+mMSCs)	mMSCs	mBMCs	mMSCs/mBMCs
Inlet	2.2 ± 0.5%	N.A.	N.A.	N.A.
Outlet 1	0.0 ± 0.0%	0.0 ± 0.0%	0.0 ± 0.0%	0.0 ± 0.0×
Outlet 2	0.0 ± 0.0%	0.0 ± 0.0%	0.8 ± 0.4%	0.0 ± 0.0×
Outlet 3	0.0 ± 0.0%	0.0 ± 0.0%	7.8 ± 1.3%	0.0 ± 0.0×
Outlet 4	0.1 ± 0.0%	1.0 ± 0.1%	23.0 ± 1.1%	0.0 ± 0.0×
Outlet 5	0.2 ± 0.1%	2.6 ± 0.9%	29.7 ± 1.9%	0.1 ± 0.0×
Outlet 6	1.2 ± 0.3%	20.7 ± 1.6%	30.0 ± 2.4%	0.6 ± 0.1×
Outlet 7	13.1 ± 2.9%	73.2 ± 1.5%	8.7 ± 0.7%	6.0 ± 0.4×
Outlet 8	44.8 ± 8.1%	2.5 ± 0.0%	0.1 ± 0.0%	20.6 ± 6.6×

Table S2. Number of mMSCs expressing surface biomarkers (Sca-1/Ly6, CD45, and CD29) collected from the inlet in comparison with those from the outlets after inertial microfluidic sorting.

Inlet	Sca-1/Ly6	CD45	CD29
number of positive cells	136	0	141
number of cells counted	152	120	141
percentage	89%	0%	100%
Outlet	Sca-1/Ly6	CD45	CD29
number of positive cells	111	0	138
number of cells counted	120	105	138
percentage	93%	0%	100%