

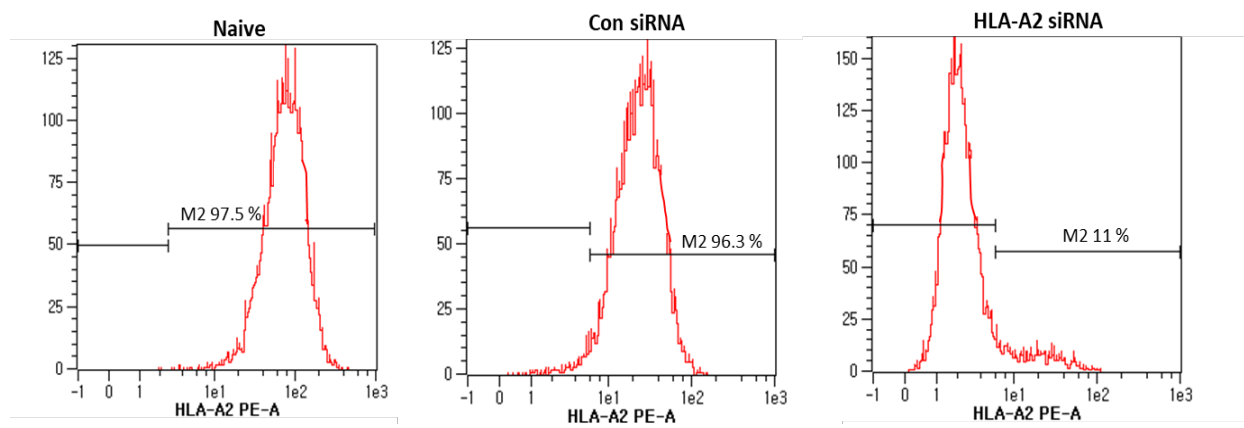
## Supplementary Materials:

	1	2	3	4	5	6	7	8	9	10	11	12
A	Buffer	CD1a	CD1b	CD1d	CD2	CD3	CD4	CD4v4	CD5	CD6	CD7	CD8a
B	CD8b	CD9	CD10	CD11a	CD11b	CD11c	CD13	CD14	CD15	CD15a	CD16	CD18
C	CD19	CD20	CD21	CD22	CD23	CD24	CD25	CD26	CD27	CD28	CD29	CD30
D	CD31	CD32	CD33	CD34	CD35	CD36	CD37	CD38	CD39	CD40	CD41a	CD41b
E	CD42a	CD42b	CD43	CD44	CD45	CD48a	CD48b	CD48c	CD46	CD47	CD48	CD49a
F	CD49b	CD49c	CD49d	CD49e	CD50	CD58a	CD53	CD54	CD55	CD56	CD57	CD58
G	CD59	CD61	CD62e	CD62L	CD62P	CD63	CD64	CD66 (A.C.6.4)	CD69a	CD69	CD69	CD70
H	CD71	CD72	CD73	CD74	CD75	CD77	CD78	CD80	CD81	CD83	CD84	CD85

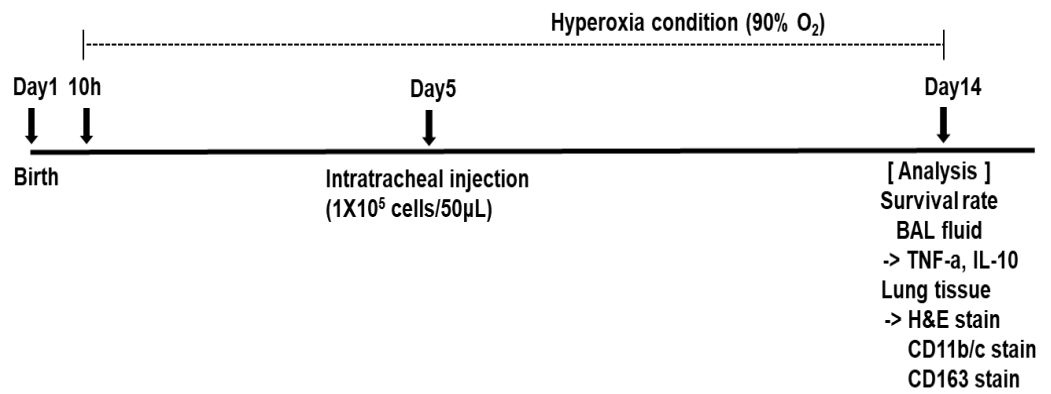
	1	2	3	4	5	6	7	8	9	10	11	12
A	Buffer	CD86	CD87	CD88	CD89	CD90	CD91	CDw93	CD94	CD95	CD97	CD98
B	CD99	CD99R	CD100	CD102	CD103	CD105	CD106	CD107a	CD107b	CD108	CD109	CD112
C	CD114	CD116	CD117	CD118	CD119	CD120a	CD121a	CD121b	CD122	CD123	CD124	CD126
D	CD127	CD128 (CD135)	CD130	CD134	CD135	CD137	CD137 (Ligand)	CD138	CD140a	CD140b	CD141	CD142
E	CD144	CD146	CD147	CD150	CD151	CD152	CD153	CD154	CD158a	CD158b	CD161	CD162
F	CD163	CD164	CD165	CD166	CD171	CD172a	CD177	CD178	CD180	CD181	CD183	CD184
G	CD193	CD195	CD196	CD197	CD200	CD205	CD206	CD209	CD220	CD221	CD226	CD227
H	CD229	CD231	CD235a	CD243	CD244	CD255	CD268	CD271	CD273	CD274	CD275	CD278

	1	2	3	4	5	6	7	8	9	10	11	12
A	Buffer	CD275	CD282	CD305	CD309	CD314	CD321	CDw327	CDw328	CD329	CD335	CD336
B	CD337	CD338	CD340	cd3TCR	IL20RA	BLTR-1	CLIP	CMRF-44	CMRF-56	EGF-R	MLP-R	γδTCR
C	Herp Progenitor Cell	HLA-A,B,C	HLA-A2	HLA-DQ	HLA-DR	HLA-DR DP DQ	Invariant NKT	CD28 (p135-137)	MIC A/B	NKG1	SSEA-1	SSEA-4
D	TRA-1-80	TRA-1-81	V823	V88	CD132a	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer
E	migM	migG1	migG2a	migG2b	migG3	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer
F	CD49f	CD164	CD126	CD133	CD201	CD210	CD212	CD267	CD294	SSEA-3	CD133 (ref)	CD133 (ref)
G	igM	igG1	igG2a	igG2b	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer
H	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer

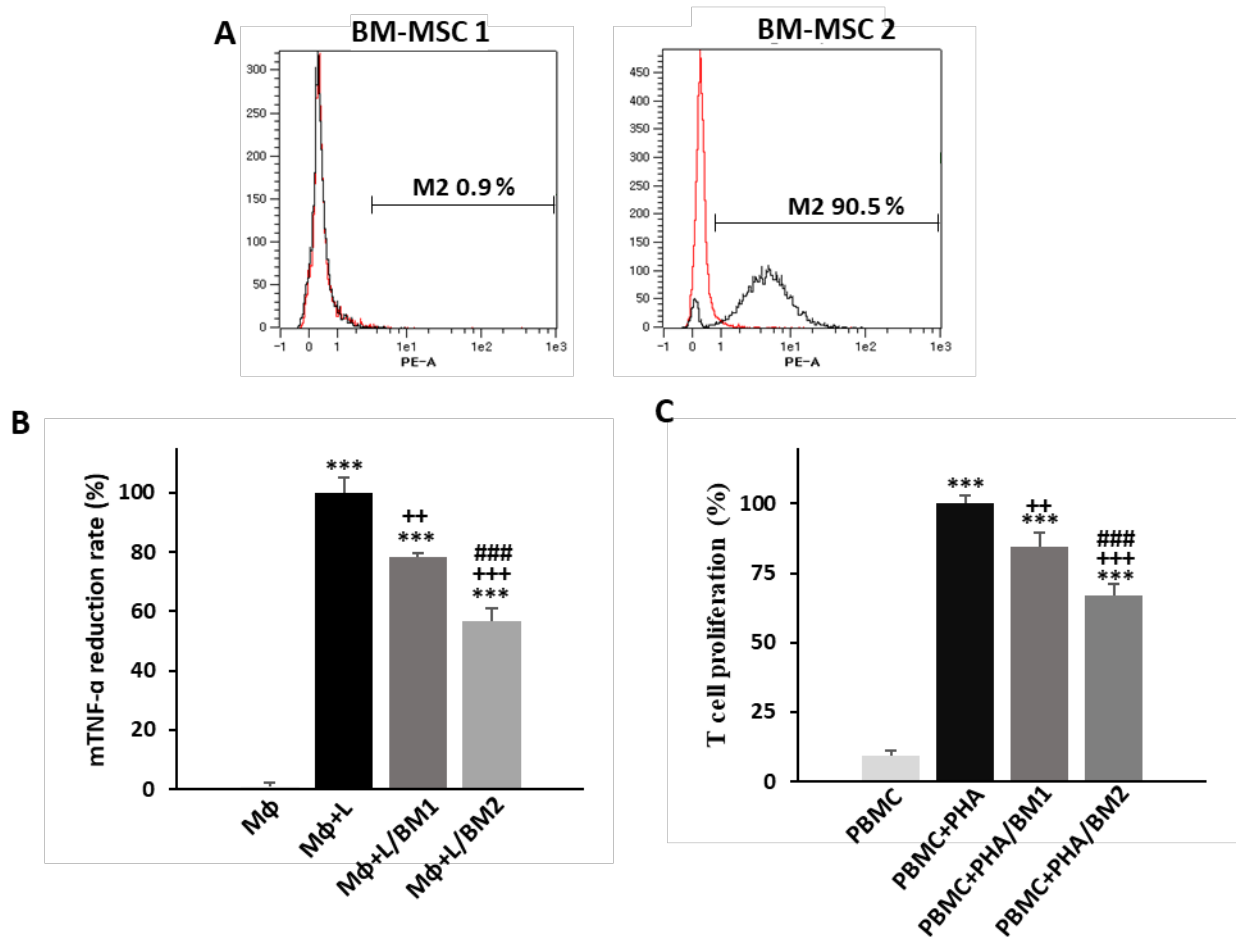
**Figure S1.** Cell surface antibody screening with Lyoplates. Lyophilized antibodies against 242 human cell surface markers are contained within the 96 well plates.



**Figure S2.** Silencing of HLA-A2 expression. UCB-MSCs were transfected with scramble siRNA (Con siRNAMSC) or HLA-A2 siRNA at P6 before injection in BPD model rats. Downregulated expression of HLA-A2 was confirmed via flow cytometry, confirming M2-related expression.



**Figure S3.** Experimental scheme of MSCs administration in the hyperoxic rat model.



**Figure S4.** HLA-A2 expression in BM-MSCs from two different donors. (A) The protein expression levels of HLA-A2 were analyzed via flow cytometry. HLA-A2 expression was higher in BM1 compared to BM2 MSCs. (B) Raw 264.7 cells were exposed to LPS and co-cultured with BM-MSCs (1 or 2) for 2 days. Cell supernatants were analyzed for mouse TNF- $\alpha$  via ELISA. All MSCs exhibited anti-inflammatory effects. Two BM-MSCs exhibited significant difference in TNF- $\alpha$  suppression. Error bars represent means  $\pm$  SD,  $n=5$  per group; \*\*\*  $p < 0.001$ , vs. M $\Phi$ , +++  $p < 0.001$ , ++  $p < 0.01$  vs. M $\Phi$ +L, ###  $p < 0.01$  vs. M $\Phi$ +L/BM1. (C) PBMCs were stimulated with PHA and were then co-cultured with MSCs for 3 days. The proliferation of T cells is shown as a percentage relative to the positive control (PBMC+PHA; set to 100%). All MSCs exhibited T cell-suppressive effects. Two groups showing significant differences in T cell proliferation. Error bars represent the means  $\pm$  SD,  $n=5$  per group; \*\*\*  $p < 0.001$ , vs. PBMC, +++  $p < 0.001$ , ++  $p < 0.01$  vs. PBMC+PHA, ###  $p < 0.01$  vs. PBMC+PHA /BM1. M $\Phi$ ; macrophage, L; LPS, PBMC; peripheral blood mononuclear cell, PHA; phytohemagglutinin.

**Table S1.** Basic information of UCB-MSCs.

UCB-MSCs	<u>Surface marker</u>		Differentiation
	Positive	Negative	
#1	Pass	Pass	Pass
#2	Pass	Pass	Pass
#3	Pass	Pass	Pass
#4	Pass	Pass	Pass
#5	Pass	Pass	Pass
#6	Pass	Pass	Pass
#7	Pass	Pass	Pass
#8	Pass	Pass	Pass
#9	Pass	Pass	Pass
#10	Pass	Pass	Pass
#11	Pass	Pass	Pass
#12	Pass	Pass	Pass
#13	Pass	Pass	Pass
#14	Pass	Pass	Pass
#15	Pass	Pass	Pass

UCBs were isolated from three independent donors (UCB #1–15). UCB-MSCs were characterized based on MSC surface marker expression and MSC differentiation potential (positive: CD73, CD90, CD105, and CD166  $\geq 80\%$ ; negative: CD14, CD45  $\leq 1.0\%$ ; differentiation: osteogenic, chondrogenic, adipogenic).

**Table S2.** Sequences of primers and siRNAs.

<b>Construct</b>	<b>Sequence (5'-3')</b>
Scramble siRNA	UGGUUUACAUGUCGACUAA
	UGGUUUACAUGUUGUGUGA
	UGGUUUACAUGUUUUCUGA
	UGGUUUACAUGUUUCCUA
<i>HLA-A2</i> siRNA	GAUGCUGAACAGUGACAAA
	CGGAAAGCUUGCCUCAAUC
	UUACAGUGUUUCUGGCUUA
	GCUGGCGGAUCCAAGCAA
<i>HLA-A2</i> primer	ACUAAGAGUGGUCGAAGAA
	GCACAGCAGCAGAUUCGAUU

**Table S3.** Groups for the *in vivo* experiment

Group	Number	MSCs (cells)	PBS volume (μL)
Normal control	10	-	50
Hyperoxic lung injury	18	-	50
BPD+naïve MSC	15	1×10 <sup>5</sup>	50
BPD+con siRNA MSC	15	1×10 <sup>5</sup>	50
BPD+HLA-A2 siRNA MSC	15	1×10 <sup>5</sup>	50

**Table S4.** Surface marker expression among different stem cell populations

Transfection	CD14	CD45	HLA DR	CD73	CD90	CD105	CD166
Naive	-	-	-	+	+	+	+
Con siRNA	-	-	-	+	+	+	+
HLA-A2 siRNA	-	-	-	+	+	+	+

The cells were transfected under three conditions. Surface antigen expression was assessed via flow cytometry. Three condition cells were strongly positive for MSC-specific markers CD73, CD90, CD105, and CD166, while negative for CD14, CD45, and HLA-DR (+: more than 80%; -: less than 5%).