Supplementary Materials

HyClone Advanced Stem Cell Medium and Medium Supplement were purchased from Thermo Fisher Scientific (Waltham, MA). CMRL-1066 medium for islet culture and 6-diamidino-2-phenylindole (DAPI) were purchased from Sigma Aldrich (St. Louis, MO). Fetal bovine serum (FBS) was purchased from MediaTech Cellgro. (Herndon, VA). Phosphate-buffered solution (PBS) was purchased from GIBCO-BRL (Gaithersburg, MD). Recombinant human tumor necrosis factor (TNF)-α, interleukin (IL)-1β, interferon (IFN)-γ, IL-10sR and the ELISA kits for human hepatocyte growth factor (HGF), IL-10, IL-2, IL-2sRα and IFN-γ were purchased from R&D Systems (Minneapolis, MN). Human insulin ELISA kit was purchased from Calbiotech (Spring Valley, CA, USA). Human c-peptide ELISA kit was purchased from Alpco Diagnostics (Windham, NH). The primary antibodies for human insulin, von-willebrand factor (vWF), CD3, CD80, CD86, CD14, Fas Ligands (FasL, or CD95L), human lymphocyte antigen (HLA)-DR, HLA Class I, isotype controls and the secondary antibodies were purchased from Abcam (Cambridge, MA). Ultrasensitive One Touch glucose test strips and One Touch Ultra glucometer were purchased from LifeScan (Milpitas, CA). Tissue-Tek O.C.T. compounds were purchased from Sakura Finetek (Torrance, CA).

Supplementary Figures

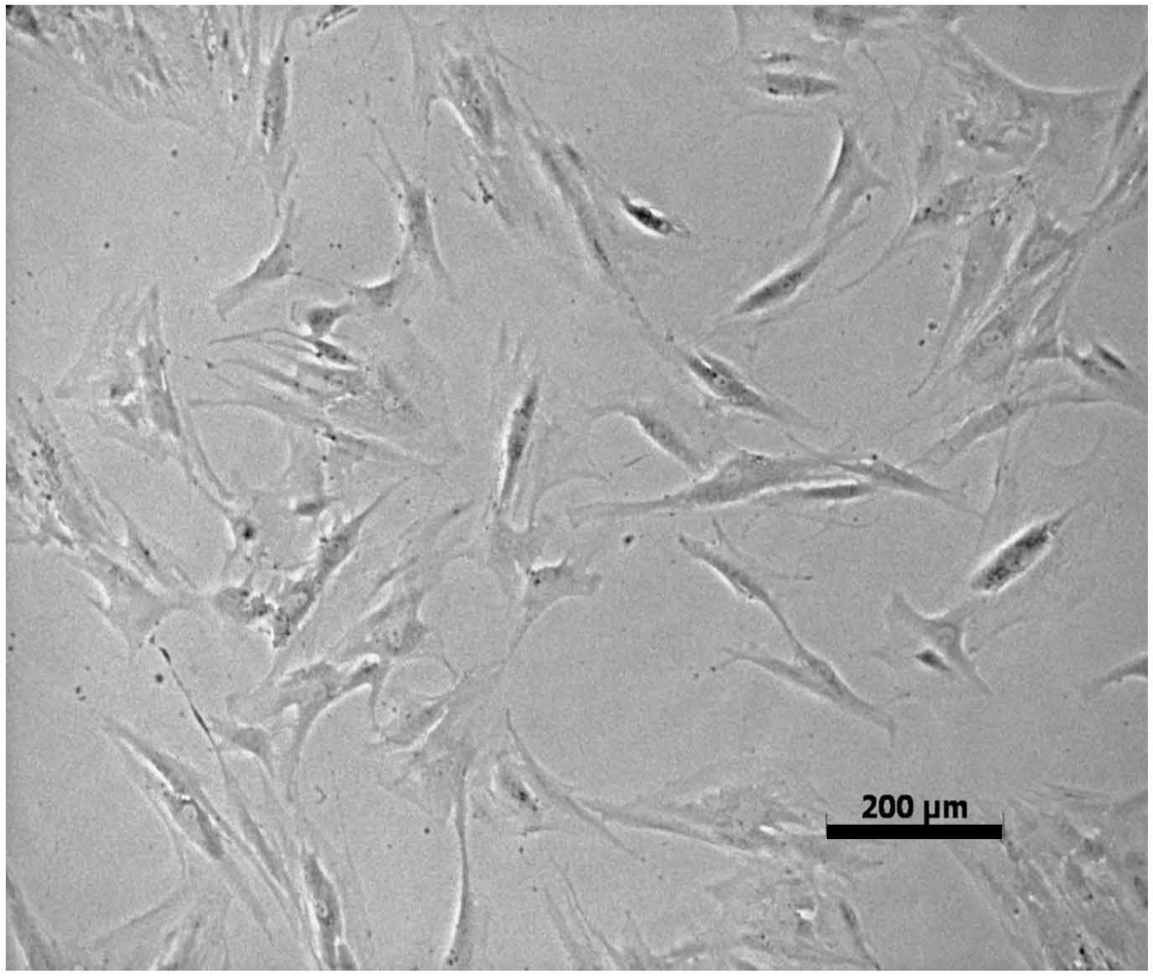
Figure S1. Characterization of human bone marrow derived mesenchymal stem cells (hBMSCs). **(a)** hBMSCs are spindle-shaped adult stem cells under bright field. Scale bar represents 200 μm. **(b)** hBMSCs are positive for HLA class I and negative for HLA-DR, FasL, CD14, CD80 and CD86. Open circle represents the isotype control.

Figure S2. Human immunity can be rebuilt in NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ (NSG) mice but not NOD.CB17-Prkdcscid/J (NOD-SCID) mice using human peripheral blood mononuclear cells (PBMCs). (**a**) Isolation and characterization of PBMCs (left) from fresh buffy coat. (**b-c**) The serum human IgG concentration (**b**) and the staining of human CD3+ T cells in the spleen sections (**c**) of NSG mice and NOD-SCID mice at 2 weeks after the injection of PBMCs ($5x10^6$/mouse). Scale bar represents 50 μm.

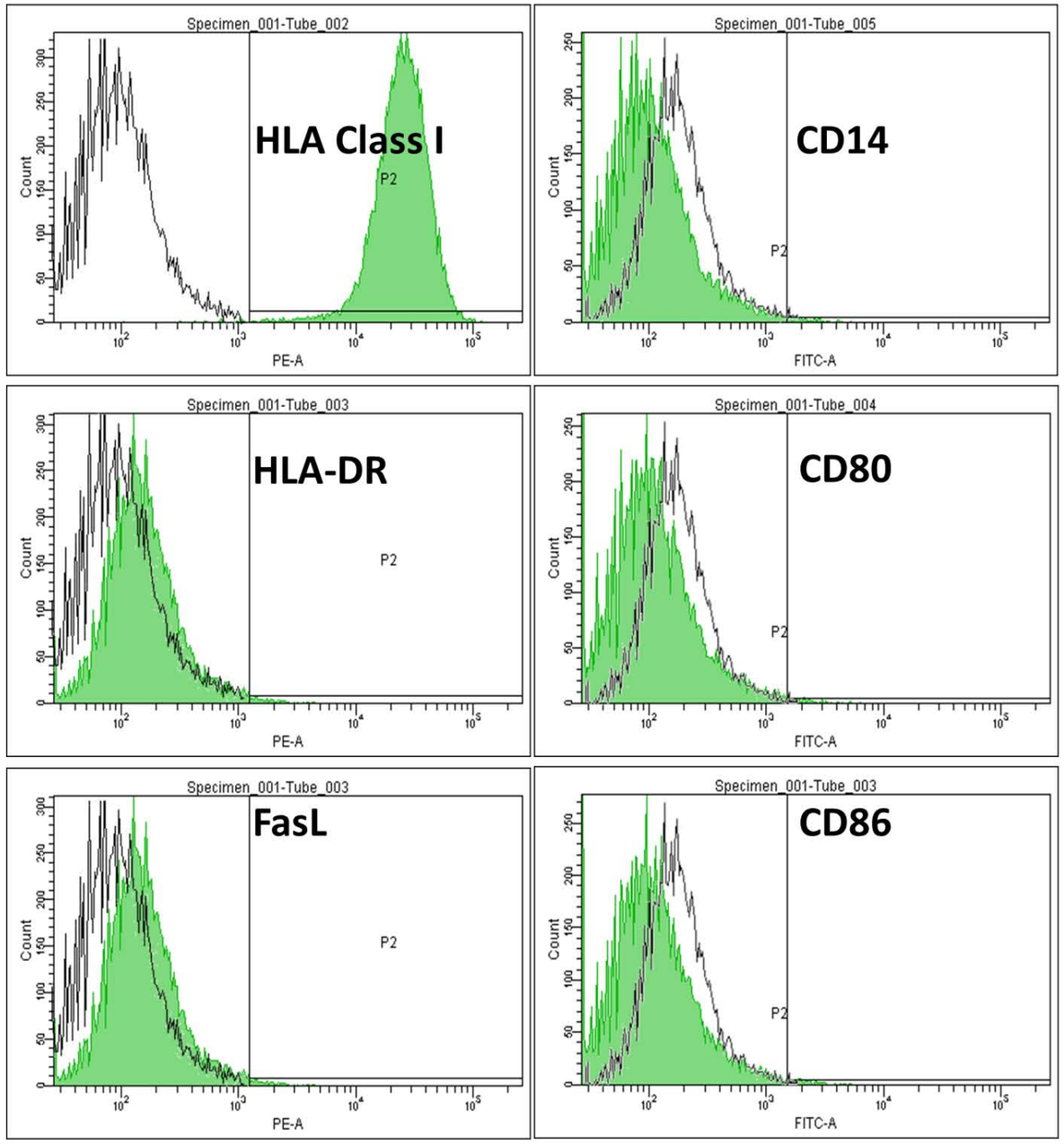
Figure S3. Human bone marrow derived mesenchymal stem cells (hBMSCs) did not induce significant apoptosis to the co-cultured peripheral blood mononuclear cells (PBMCs) as determined by Annexin V-FITC staining. Left, PBMCs alone; right, PBMCs with hBMSCs. Data was presented as the mean ± S.D., n=3.

Figure S4. Human bone marrow derived mesenchymal stem cells (hBMSCs) did not need to be conditioned by peripheral blood mononuclear cells (PBMCs) to exert immunosuppressive effect. The media of hBMSCs was equally potent to suppress the activation of PBMCs (**a**) and to activate the IL-10 transcription in CD14+ monocytes (**b**). IL-Data was presented as the mean ± S.D., n=3.

A


200 µm

B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P2
Count
FITC-A
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P2
Count
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CD80
P2
Count
FITC-A
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FasL
P2
Count
PE-A
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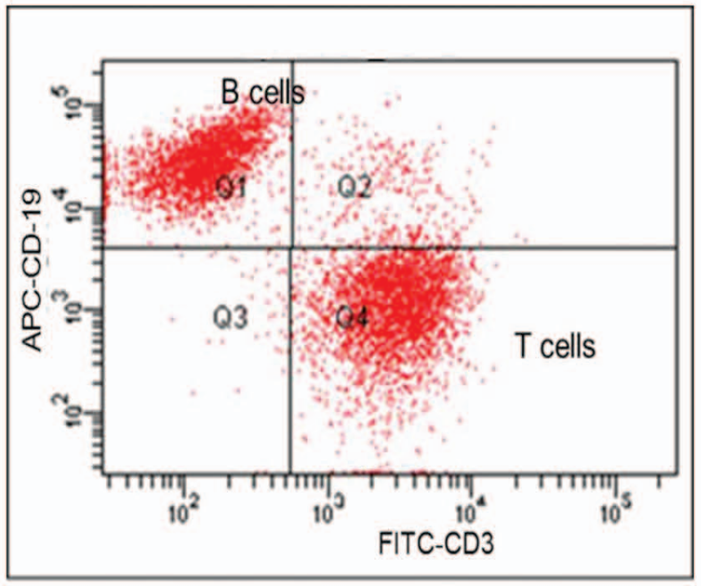
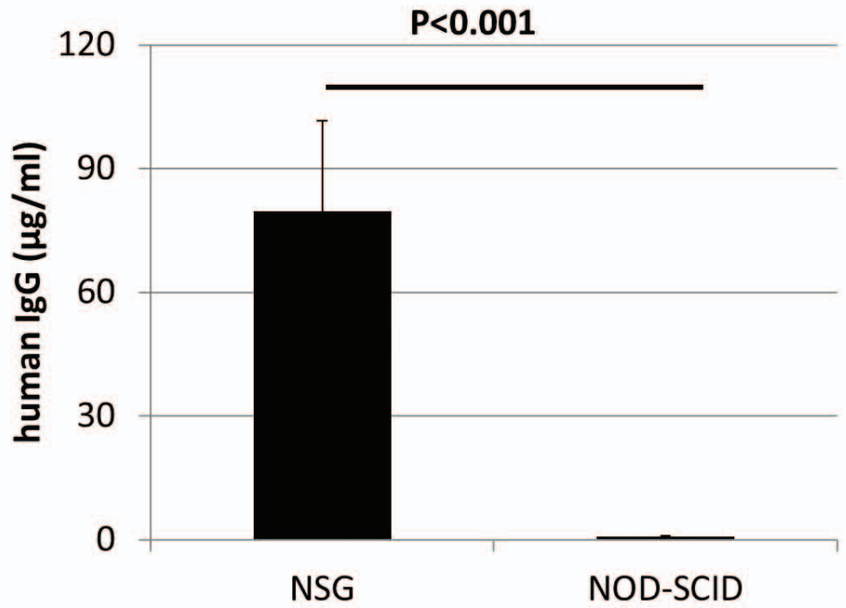
CD86
P2
Count
FITC-A

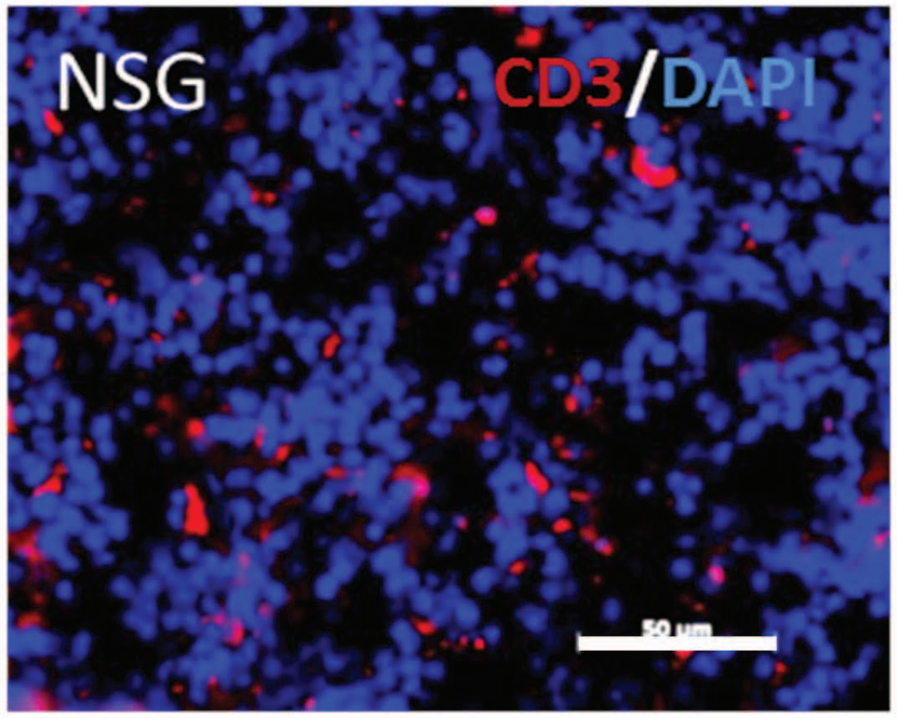
A

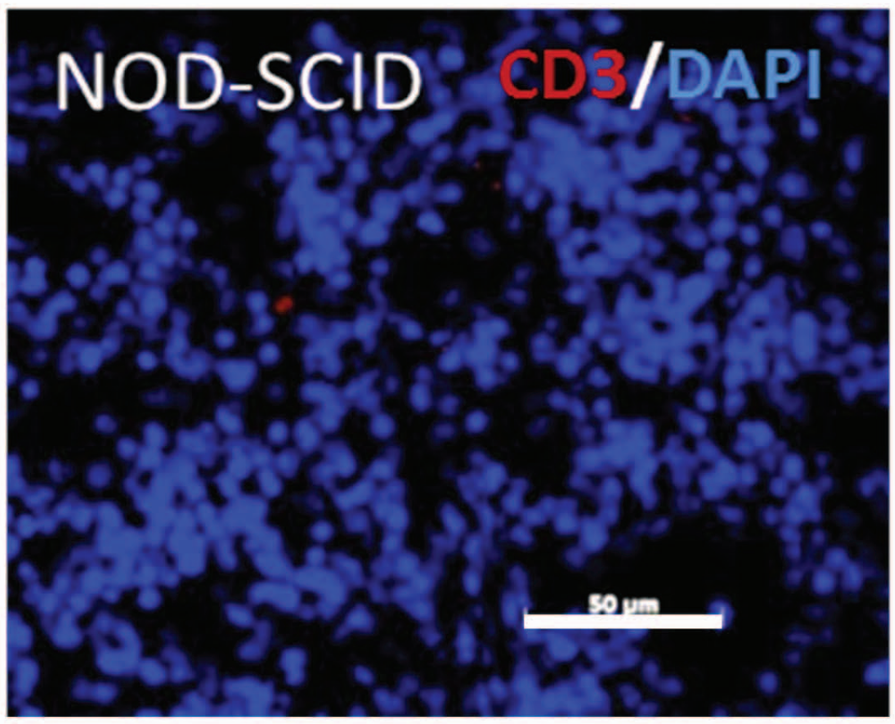

B cells
Q1
Q2
Q3
Q4
T cells
APC-CD-19
FITC-CD3

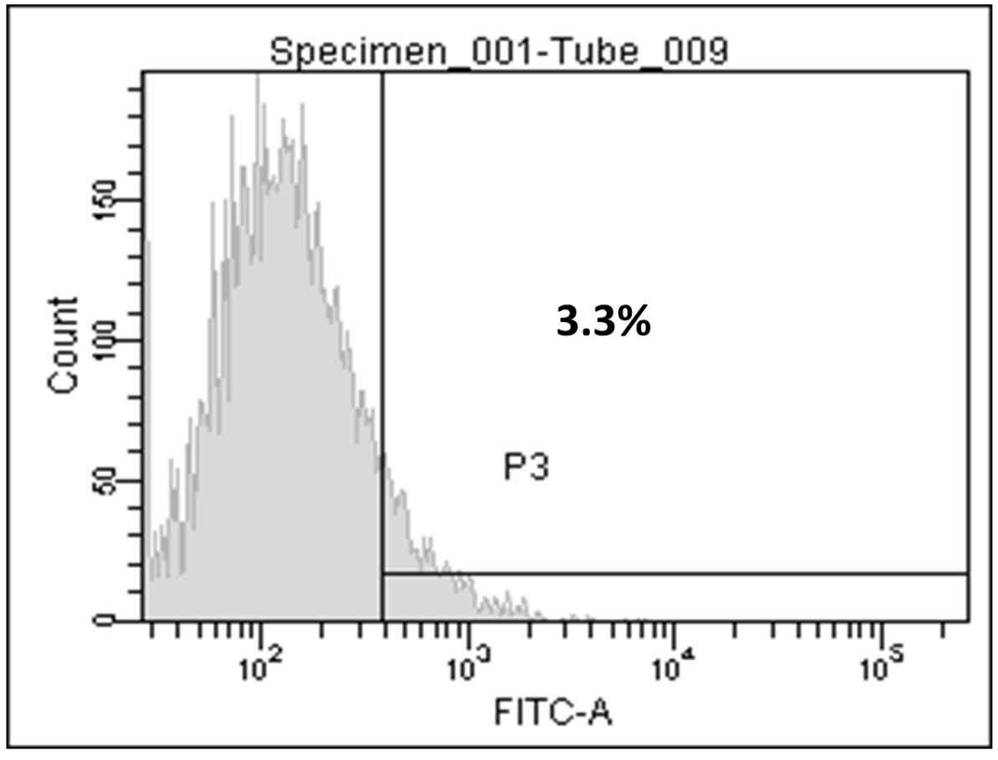
B


P<0.001
120
90
60
30
0
human IgG (µg/ml)
NSG
NOD-SCID

C


NSG
CD3/DAPI
50 µm


NOD-SCID
CD3/DAPI
50 µm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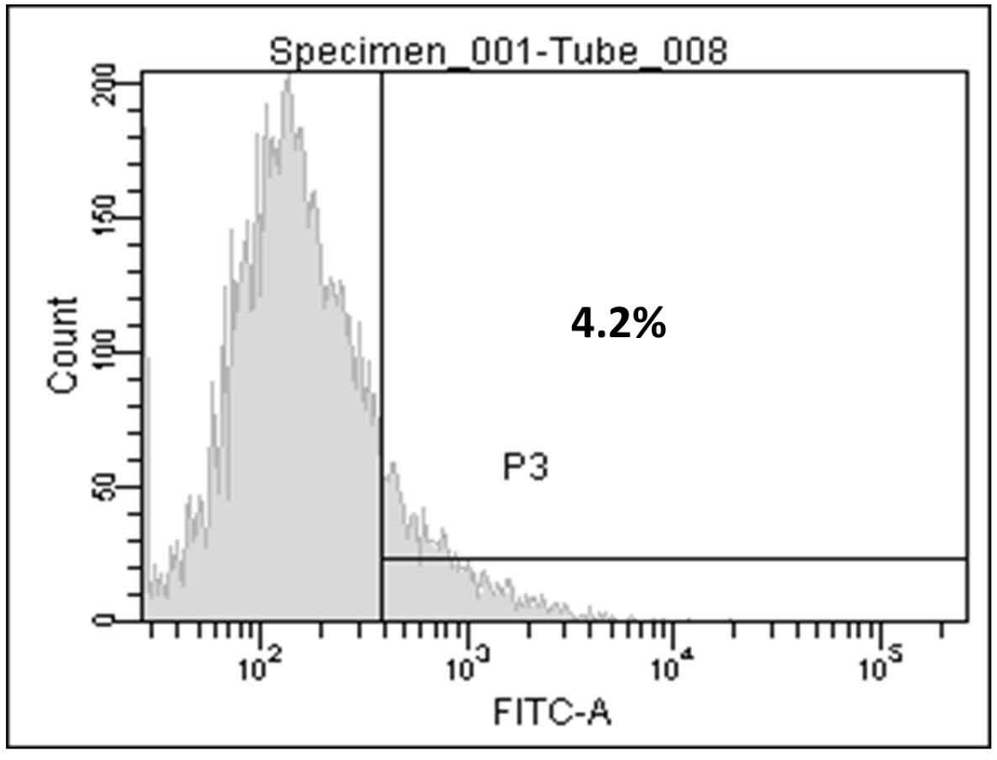
P3
10^2
10^3
10^4
10^5
FITC-A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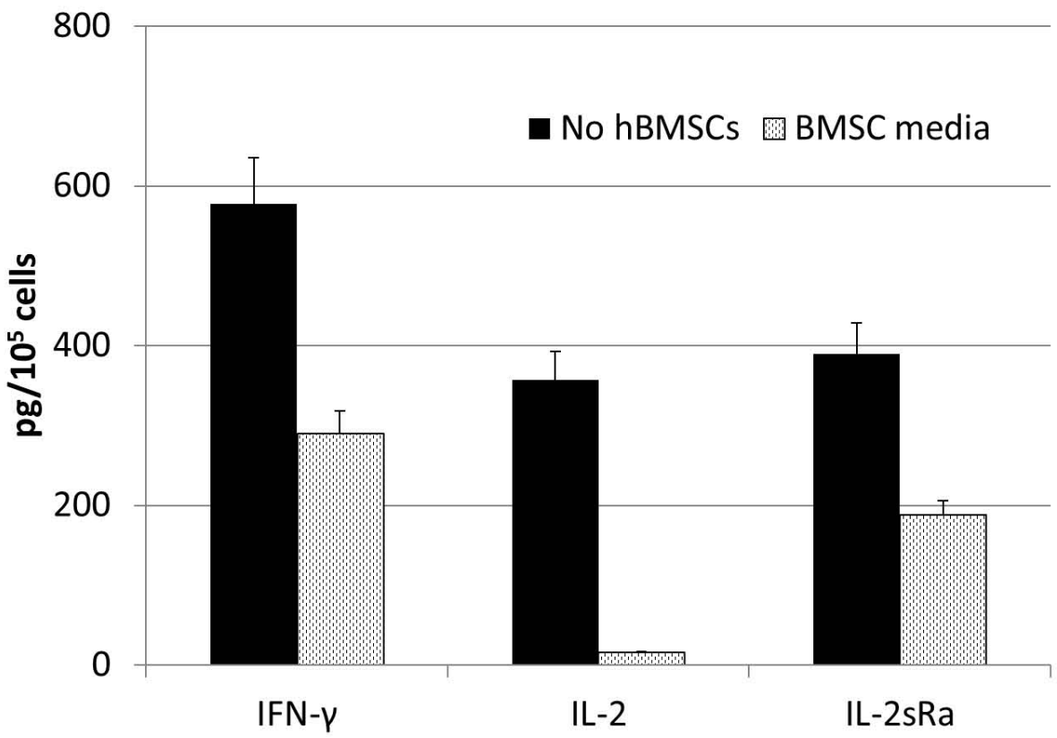
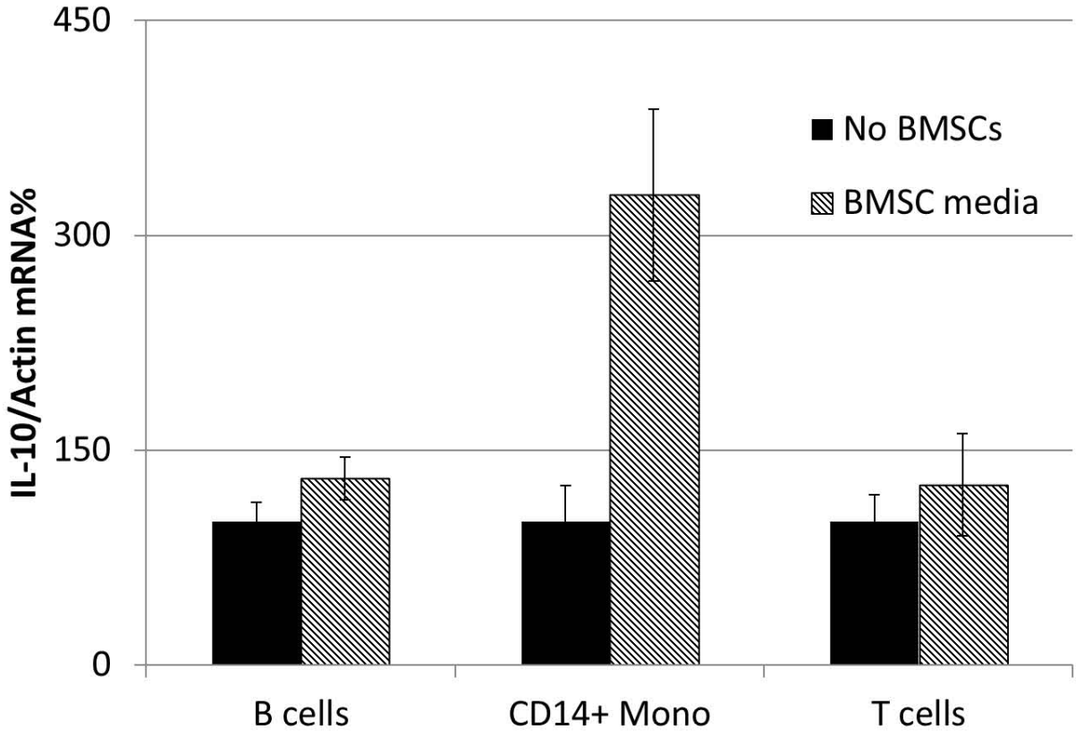
100
50
0
4.2%
P3
10^2
10^3
10^4
10^5
FITC-A

A


800
600
400
200
0
pg/10⁵ cells
No hBMSCs
BMSC media
IFN-γ
IL-2
IL-2sRa

B


450
300
150
0
IL-10/Actin mRNA%
No BMSCs
BMSC media
B cells
CD14+ Mono
T cells