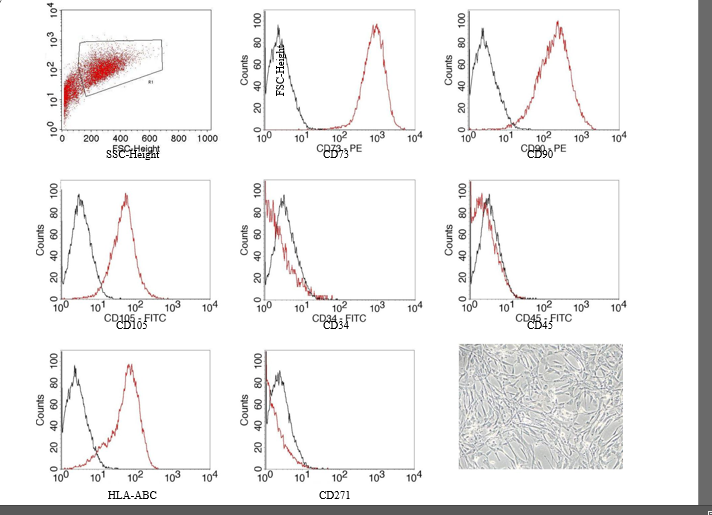
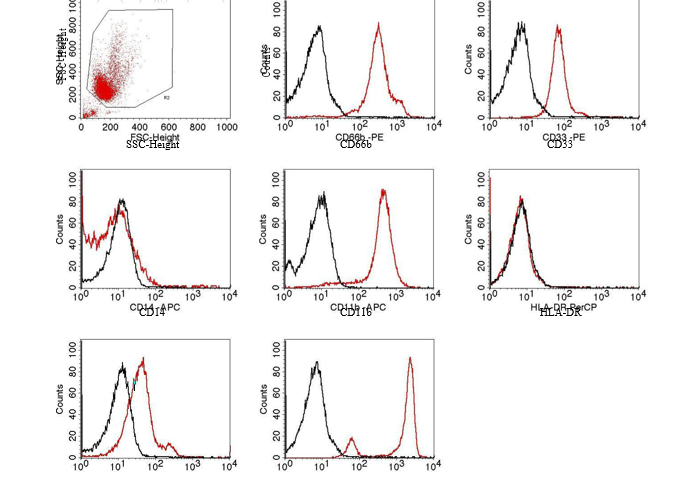


**Figure S1: Representative histograms of polyclonal T cell proliferation assay.** Responder PBMCs were isolated, labelled with CFSE and stimulated withOKT3 and IL-2 to induce polyclonal T cell proliferation. The stimulated responder PBMCs were co-cultured with allogenic MSCs, MDSCs, or CD4+CD25+

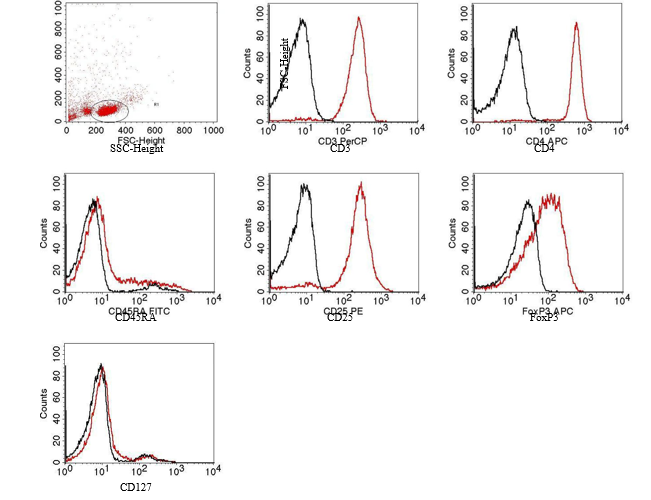
Tregs in different ratios for 4-5 days at 37°C and 5 % CO2. Stimulated PBMCs without immunomodulatory cells and unstimulated PBMCs were seeded as controls. After incubation, proliferation of CD4+ and CD8+ T cells was analyzed by flow cytometry. Representative histograms in the ratios 1:0.16 and 1:0.5 are shown.



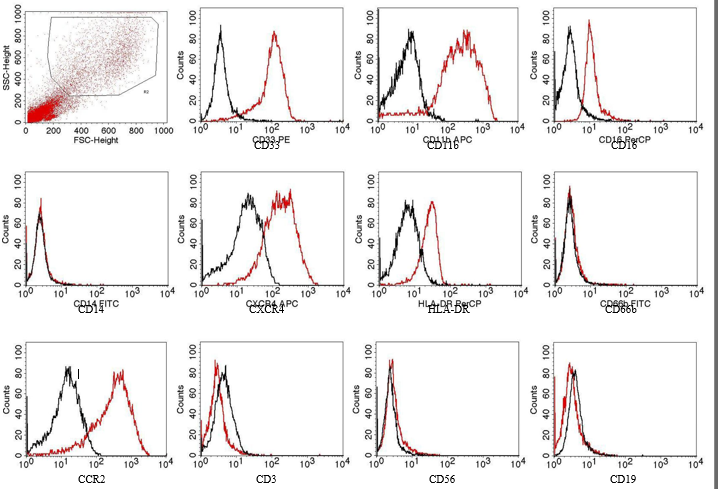
**Figure S2: Characterization of MSCs.** Human MSCs were isolated, cultured and cell morphology was analyzed at ×20 original magnification by Zeiss Axiovert135 microscopy (Carl Zeiss) using Canon EOS 550D camera (Canon) and Eos Utility software (Canon). The immunophenotype of MSCs was confirmed as CD73+, CD90+, CD105+, HLA-ABC+, CD34-, CD45-, and CD27-. Representative histograms are shown with surface markers in red and isotype controls in black.



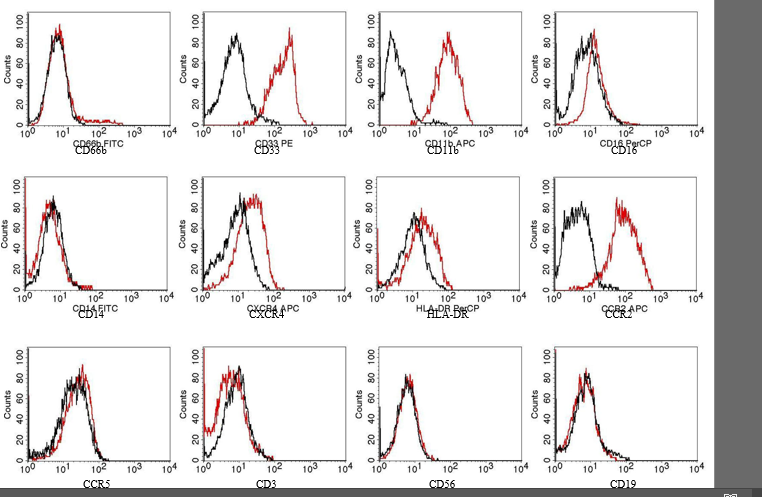
**Figure S3: Characterization of PMN-MDSCs.** PMN-MDSCs were obtained from PBMC fraction by magnetic separation with anti-human CD66b-FITCantibodies and anti-FITC MicroBeads. The immunophenotype of PMN-MDSCs was determined as SSChigh, CD66b+, CD33+, CD11b+, CXCR4+, CD16+, CD14-, and HLA-DR-. Shown are representative histograms with surface markers in red and isotype controls in black.



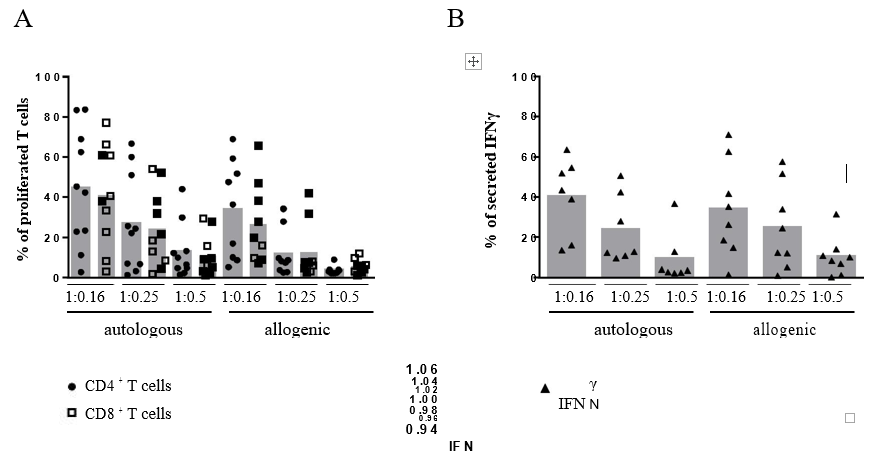
**Figure S4: Characterization of regulatory CD4+CD25+ T cells.** Tregs were isolated from the PBMC fraction by using CD4+CD25+Regulatory T Cell IsolationKit (Miltenyi Biotec). Tregs were identified as CD3+, CD4+, CD25+, FoxP3+, CD127-, and CD45RAlow. Typical histograms are presented with cell markers in red and isotype controls in black.



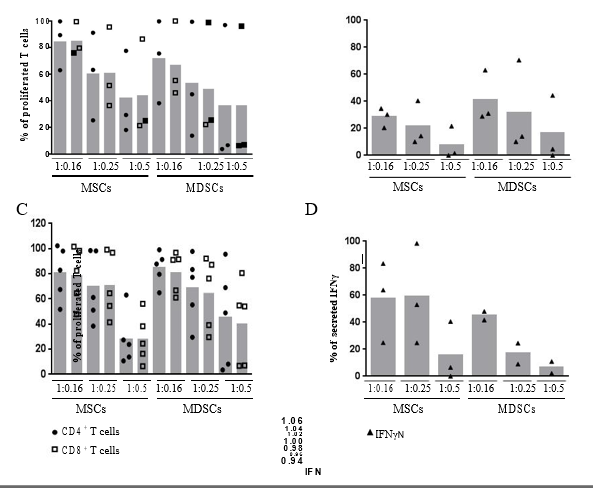
**Figure S5: Characterization of PBMC-derived cytokine-induced MDSCs.** PBMCs were cultured in complete medium for 7 days with 10 ng/ml GM-CSF.Cytokine-induced MDSCs from PBMCs were identified as SSChigh, CD33+, CD11b+ and CD14- as well as CXCR4+, CD16+, CD66b-, HLA-DRinter, CCR2+, and negative lineage markers (CD3, CD19, CD56). In the representative histograms, surface markers are shown in red and isotype controls in black.



**Figure S6: Characterization of BMMC-derived cytokine-induced MDSCs.** After density gradient centrifugation of bone marrow aspirates, BMMCs werecultured in complete medium for 7 days with 10 ng/ml GM-CSF. Cytokine-induced MDSCs from BMMCs were determined as SSChigh, CD33+, CD11b+ and CD14-, additional confirmed as CXCR4+, CD16+, CD66b-, HLA-DRinter and negative lineage markers (CD3, CD19, CD56). In order to be distinct from neutrophils, the cytokine-induced MDSCs were stained with CCR2 and CCR5 antibodies. Representative histograms are shown with surface markers in red and isotype controls in black.



**Figure S7: Comparison of autologous and allogenic PMN-MDSCs.** (A)ResponderPBMCs were labelled with CFSE, stimulated with OKT3 and IL-2. PMN-MDSCs were isolated by magnetic separation with CD66b antibodies and appropriate MicroBeads. Stimulated PBMCs were cultured in different ratios of 1:0.16, 1:0.25 or 1:0.5 with PMN-MDSCs from an autologous or allogenic donor as indicated. After 4 days of incubation, the proliferation of T cells was analyzed by flow cytometry. Each donor of responder PBMCs is presented by ● for CD4+ and CD8+ T cells. (B) Supernatants from the co-cultured PBMCs with PMN-MDSCs were collected after 4 days and assessed for IFNγ levels by ELISA. Each indicates the level of IFNγ from a single donor of responder PBMCs.



**Figure S8: Comparison of MSCs and PMN-MDSCs from the same donor in an autologous and allogenic setting.** (A and C) First, MSCs were isolated andcultured for up to 10 passages. PBMCs from heparinized fresh blood of the same donor were isolated by density gradient centrifugation. PMN-MDSCs were isolated from these PBMCs by magnetic separation with CD66b antibodies and appropriate MicroBeads. Additionally, responder PBMCs were labeled with CFSE, stimulated with OKT3 and IL-2. Stimulated PBMCs were cultured with MSCs or PMN-MDSCs from the same donor in different ratios of 1:0.16, 1:0.25 or 1:0.5. After 4 days of incubation, the proliferation of T cells was analyzed by flow cytometry. Each donor of responder PBMCs is presented by ● for CD4+ and by □ for CD8+ T cells. (B and D) Supernatants from the co-cultured PBMCs with MSCs or PMN-MDSCs were collected after 4 days and tested by IFNγ ELISA. Each indicates the level of IFNγ from a single donor of responder PBMCs. In Figure S8 A-B, the autologous experimental setting is presented with responder PBMCs, MSCs, and PMN-MDSCs from the same donor, whereas in Figure S8 C-D the allogenic setting is shown with stimulated PBMCs from another donor, but still MSCs and PMN-MDSCs were obtained from the same donor.