Supplementary Figure Legends

Figure S1. Immunosuppressive effect of another constitutive IDO-expressing MSC clone (MSC-IDOc2)

The same experiment described in **Fig. 2C** was repeated with MSC-IDOc2.

Figure S2. Expression of iNOS or IDO in MSCs upon cytokine stimulation and their effect on lymphocyte proliferation

(A) Mouse bone marrow-derived MSCs (BM-MSCs) and inducible IDO-expressing MSCs (MSC-IDOi1, MSC-IDOi2 and MSC-IDOi3) were stimulated with mouse inflammatory cytokines (TNFα + IL-1β + IFNγ) at different doses and cultured for different time (0 hr, 12 hr and 24 hr). Cells were then harvested and total mRNA was extracted. hIDO message or mouse iNOS message was assayed by real-time PCR, normalized to β-actin mRNA (defined as 1000 arbitrary units).

(B) Two clones of inducible human IDO-expressing MSCs (MSC-IDOi2 and MSC-IDOi3) were tested for their effects on mouse lymphocyte proliferation, as performed in **Fig. 5A**.

(C) MSCs inhibited proliferation of lymphocytes. MSCs were co-cultured with freshly isolated mouse splenocytes at 1:20 MSC-to-splenocyte ratio in the presence of anti-CD3 and anti-CD28 for 24 hr (upper panel) or 48 hr (lower panel). Lymphocytes were harvested and stained with propidium iodide for DNA content analyzed by flow cytometry. The percentage of cells in the *S* + *G2M* region is indicated. Data shown are representative of three independent experiments.

Figure S3. Effect of iNOS$^{-/-}$ MSCs on proliferation of activated human peripheral blood mononuclear cells

iNOS$^{-/-}$ MSCs were co-cultured with OKT3-activated human peripheral blood mononuclear cells **(**PBMCs). The proliferation of T cells were assessed, as performed in **Fig. 5D**.

Figure S4. *In Situ* expression and location of human IDO in the tumor tissue

(A) B16-F0 melanoma tumor tissues were harvested at the indicated times after transplantation with either constitutive (MSC-IDOc1) or inducible (MSC-IDOi1) human IDO-expressing MSCs , or control iNOS$^{-/-}$ MSCs (MSC-control). Total mRNA was extracted, and IDO message was assayed by real-time PCR, normalized to β-actin mRNA (defined as 1000 arbitrary units).

(B) B16-F0 melanoma tumor tissues were collected 24 hr after i.p. administration of inducible IDO-expressing MSCs (containing the GFP reporter gene). Frozen microscopic slides were prepared and stained with DAPI for nuclear identification. The slides were then visualized under a confocal microscope. Tumor samples from mice administered with iNOS$^{-/-}$ MSCs (without the GFP reporter gene and the hIDO gene) were used as a control. Red arrows indicate positive staining of IDO.

(C) The in situ location of IDO protein was determined by immunohistochemistry staining. Tumor samples from mice administered with iNOS$^{-/-}$ MSCs were used as control.

Figure S5, S6, S7. Effect of IDO-expressing MSCs on the distribution of immune cell subpopulations in peripheral blood and tumor tissues

RBC-lysed whole blood or cells from tumor tissues from the mice indicated in **Fig. 6A-B** were stained for the indicated markers, and analyzed by flow cytometry to reveal the percentage of cells in each subpopulation, as in **Fig. 6D**. Constitutive human IDO-expressing MSCs (MSC-IDOc1) were used as positive control. $iNOS^{-/-}$ MSCs were used as a negative control. *p <0.05, **p < 0.01, ***p <0.001.