**Supporting Document**

**Supplemental Figure Legend**

**Supplemental Figure 1-** Human CD45+, NKT, NK, and B cells in the humanized NSG-mice after transfusion of human-spleen-mononuclear-cells (hSPMCs). ***A:*** The representative pseudocolor plot of human CD45+ cells (hCD45) versus mouse CD45+ cells (mCD45) in peripheral blood (PB) of NSG-mice (M) transfused with 1×107 hSPMCs (M/PB/hSPMC) at week 9. ***B:*** The proportion of hCD45+ cells in PB of NSG-mice transfused with 5×106 (black inverted triangle, n=5 at week 4, n=5 at week 5, n=3 at week 9), and 1×107 (diamond, n=7 at week 4, n=7 at week 5, n=5 at week 9) fresh hSPMCs, or 1×107  thawed frozen hSPMCs (squares, n=16 at week 4, n=16 at week 5, n=10 at week 9) at week 4, 5 and 9.  ***C:*** The representative pseudocolor plots of hCD3 versus hCD56 (gating on hCD45+ cells) in PB of NSG-mice transfused with 1×107 hSPMCs at week 5. ***D:*** The proportions of CD3+CD56+NKT and CD56+NK in total hCD45+ cells of the PB (black square, n=10)(M/PB) and spleens (white square, n=7)(M/Spleen) of NSG-mice transfused with 1×107 hSPMCs at week 5. ***E:*** The representative pseudocolors plots of hCD3 versus hCD19 (gating on hCD45+ cells) in spleens of NSG-mice transfused with 1×107 hSPMCs at week 5. The percentage of CD19+ B cells in total hCD45+ cells were detected only in spleen (8.9 ± 5.1%) in 3 of 10 NSG-mice transfused with 1×107 hSPMCs. Data representative of 5 independent experiments. Kruskal-Wallis test followed by Dunn’s multiple comparisons test was used for the comparisons of hCD45+ cell reconstitution (Supplementary Fig. 1B). Non-parametric Mann-Whitney test and parametric unpaired T-tests both were used for Supplementary Fig. 1D. Error bars indicate the mean ± SEM. Label for statistical significance: \*p<0.05,\*\*p< 0.01 \*\*\*p< 0.001.

**Supplemental Figure 2**-The BGL (red line) and weight (black line) profiles of diabetic NSG-mice that received human islets transplanted at day 0 and had nephrectomy (n=2) at day 47 and day 49 respectively.

**Supplemental Figure 3**-Representative H&E micrographs of liver (original magnification ×10), left kidney and spleen (original magnification ×20) in humanized NSG-mice (hNSG-mice) that received 1×107 hSPMCs at 9 week, and spleen of control from NSG-mice without transfusion. Data representative of 3 independent experiments and 9 mice.

**Supplemental Figure 4–** The representative micrographs of ***(A)***human islet-allografts under the capsule of the left kidney (original magnification ×10), and ***(B)*** right kidney (original magnification ×20) (H&E); IHC staining of ***(C)*** CD4 and ***(D)*** CD8 cells (positive cells stained brown)(original magnification ×20) in human islet-allografts from the hNSG-recipient-mice treated with IL-2(0.3 IU/m2) /rapamycin at day 62 after transfusion of hSPMC. ***E:*** The histological scoring grades of right kidneys from treated hNSG-recipient-mice (n=5) compared to NSG-mice without transfusion (Normal control), hNSG-recipient-mice with1×107 hSPMCs (n=9) at day 35 (Tx/hSPMC/d35) (n=8), and hNSG-mice with 1×107 hSPMCs at week 9 (hSPMC/w9) (n=9) after transfusion. Kruskal-Wallis test followed by Dunn’s multiple comparisons test was used for comparison. Error bars indicate the mean ± SEM.

**Supplemental Figure 5-**Expressions of human cytokines and transcription factors in sorted hCD8+ and hCD4+ T cells by real time RT-PCR. ***A:*** The expressions of IFN-γ, IL-10, TGF-β, IL-2, and perforin-1 on sorted hCD8+ T cells, and***(B)***IFN-γ, IL-10, TGF-β, IL-2, Blimp-1, T-bet Gata3 and RoRγt on sorted hCD4+ T cells from donor hSPMCs (green circle, n=4)(hSPMC), and the spleen of the hNSG-recipient-mice that had no treatment (triangle, n=3)(Tx/Without), IL-2 only treatment (square, n=3)(Tx/IL-2) at day 35 after transfusion, and the combination of IL-2/rapamycin treatment (black circle, n=3)(Tx/IL-2/Rap) at day 47-76 after transfusion. One-way ANOVA followed by Tukey’s multiple comparisons was used, except IL-2 and IL-10 expression used Kruskal-Wallis test followed by Dunn’s multiple comparisons test. Error bars indicate the mean with SEM. Label for statistical significance: \*p<0.05 and\*\*p< 0.01, \*\*\*p<0.001.