



**Figure S1** Characterization of human umbilical cord-derived mesenchymal stem cells (hUC-MSCs). (A) hUC-MSCs migrated out from the UC pieces on day 12 and exhibited a spindle shape observed by inverted microscope. Scale bar: 200  $\mu\text{m}$ . (B) At passage 5, hUC-MSCs exhibited a spindle shape observed by inverted microscope. Scale bar: 50  $\mu\text{m}$ . (C) hUC-MSCs exhibiting multipotent differentiation capacity for chondrogenesis by toluidine blue staining. Scale bar: 100  $\mu\text{m}$ . (D) hUC-MSCs exhibiting multipotent differentiation capacity for osteogenesis by alizarin red S staining. Scale bar: 200  $\mu\text{m}$ . (E) hUC-MSCs exhibiting multipotent differentiation capacity for adipogenesis by oil red O staining. Scale bar: 200  $\mu\text{m}$ . (F) Staining of hUC-MSC surface markers on the spindle-shaped cells. The spindle-shaped cells expressed CD44, CD73, CD90, and CD105, but not CD34 and CD45. Hoechst 33342 staining was used to stain cell nuclei (blue color). Scale bar: 100  $\mu\text{m}$ . (G) Flow cytometric assay of hUC-MSCs revealed expression of the hUC-MSC differentiation markers CD34 (2.3%), CD44 (95.2%), CD45 (3.2%), CD73 (96.7%), CD90 (94.3%), and CD105 (98.2%). hUC, human umbilical cord; MSC, mesenchymal stem cell.