Supplementary figures

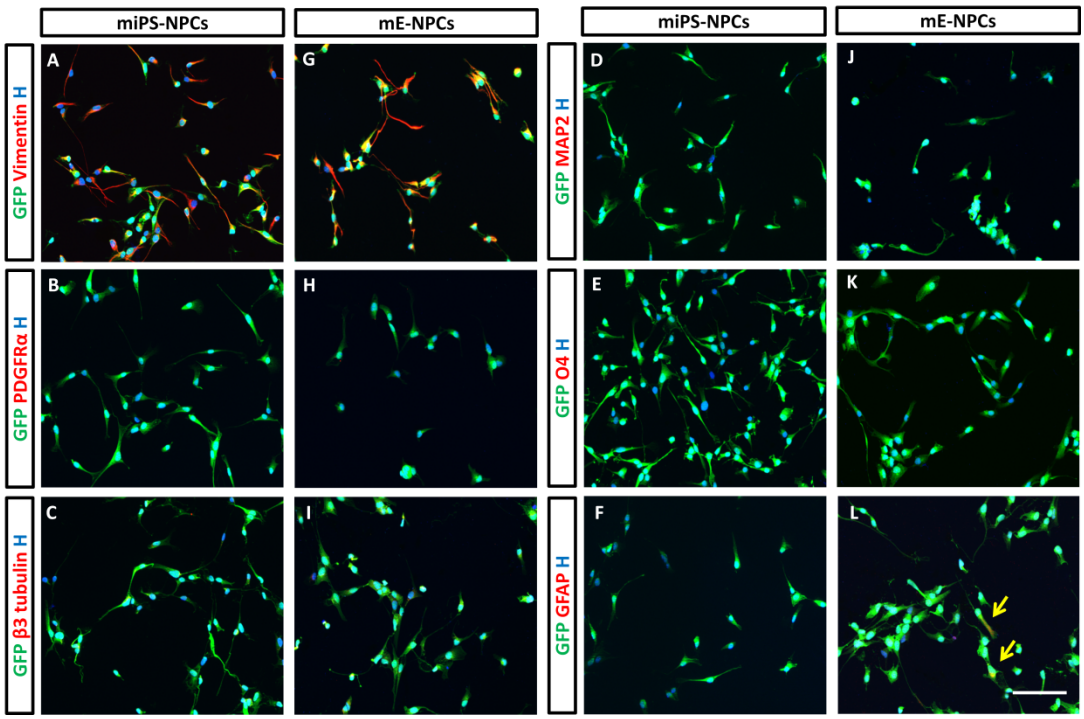

Figure S1. miPS-NPCs do not express mature markers of neural cells in vitro.

Immunocytochemical characterization of miPSC-NPCs (A-F) and mE-NPCs (G-L). Both NPCs sources expressed (A, G) vimentin but not (B, H) PDGFRα, marker of oligodendrocyte precursor cells. (C, J) Few cells expressed β3 tubulin, and (D, J) none the neuronal marker MAP2 or (E, K) oligodendrocyte marker O4. (F, L) Few mE-NPCs (arrows) but not miPS-NPCs expressed the astrocyte marker GFAP. A-L were performed in three independent experiments. H: Hoechst dye; Scale bar: 100µm.

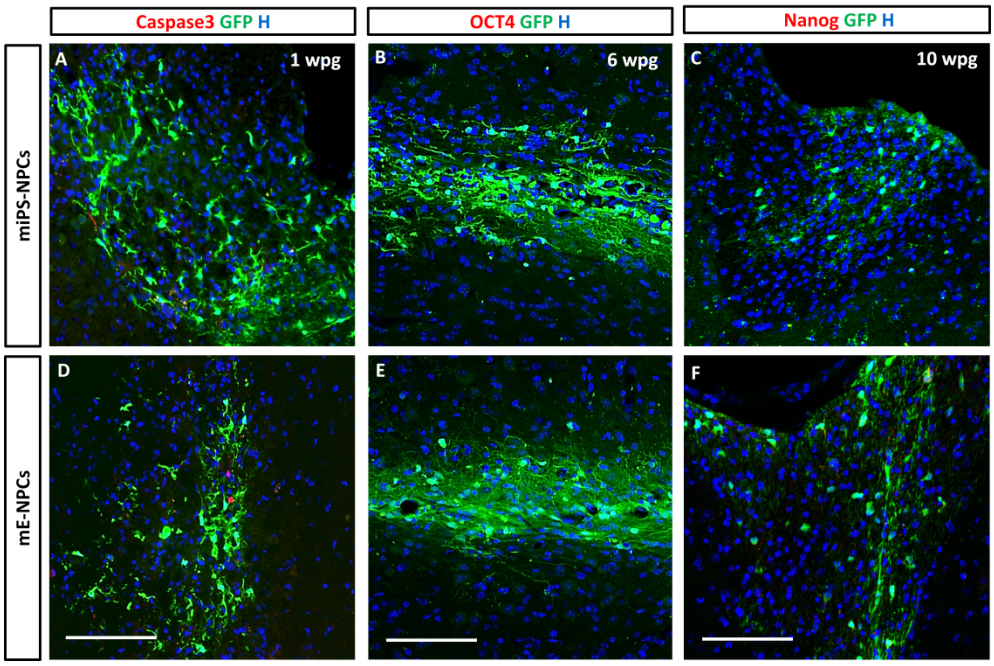

Figure S2. Analysis of survival, pluripotency and tumorogenesis of the grafted cells.

(A) Immunostaining of coronal sections of dorsal funiculus 1wpg for the apoptotic marker Caspase 3: miPS-NPCs did not undergo apoptosis in vivo. (B) Longitudinal sections of the spinal cord stained for OCT4: miPS-derived cells did not re-express this pluripotency marker 6wpg. (C) Staining of coronal sections for the tumorogenic cell marker Nanog: no sign of uncontrolled growth as far as 10wpg. (D-F) Expression of these markers in tissues grafted with mE-NPCs. n = 3 mice per each group/staining. H: Hoechst dye; wpg: week(s) post graft; Scale bars: 100µm.

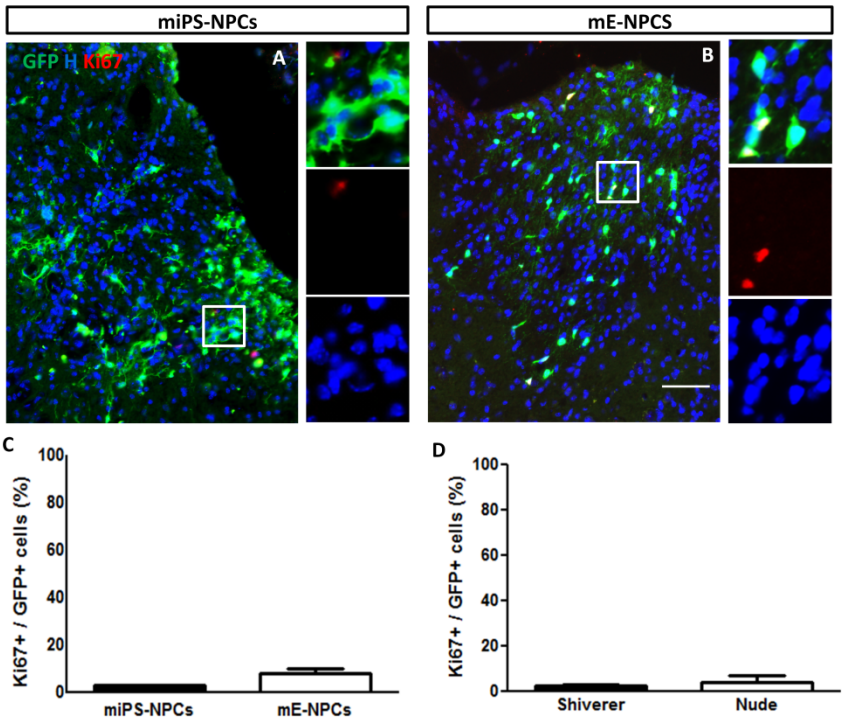

Figure S3. miPS-NPCs down-regulate their proliferation in vivo.

(A, B) Coronal sections of dorsal funiculus of transplanted *Shi/Shi:Rag2*$^{-/-}$ mice stained with the proliferation marker Ki67. (C) Up to 98% of GFP+ miPS-NPCs derived cells were negative for this marker at 6wpg. Although not significantly different from miPS derived cells, mE-NPC derived cells remained more proliferative at this time point (8% of GFP+ cells). (D) No significant difference in Ki67 expression was observed in miPS-NPCs grafted *Shi/Shi:Rag2*$^{-/-}$ mice compared to nude mice. Mann Whitney test was used for the statistical analysis of these experiments (n = 3-4 mice per each group). H: Hoechst dye; Scale bar: 50µm.

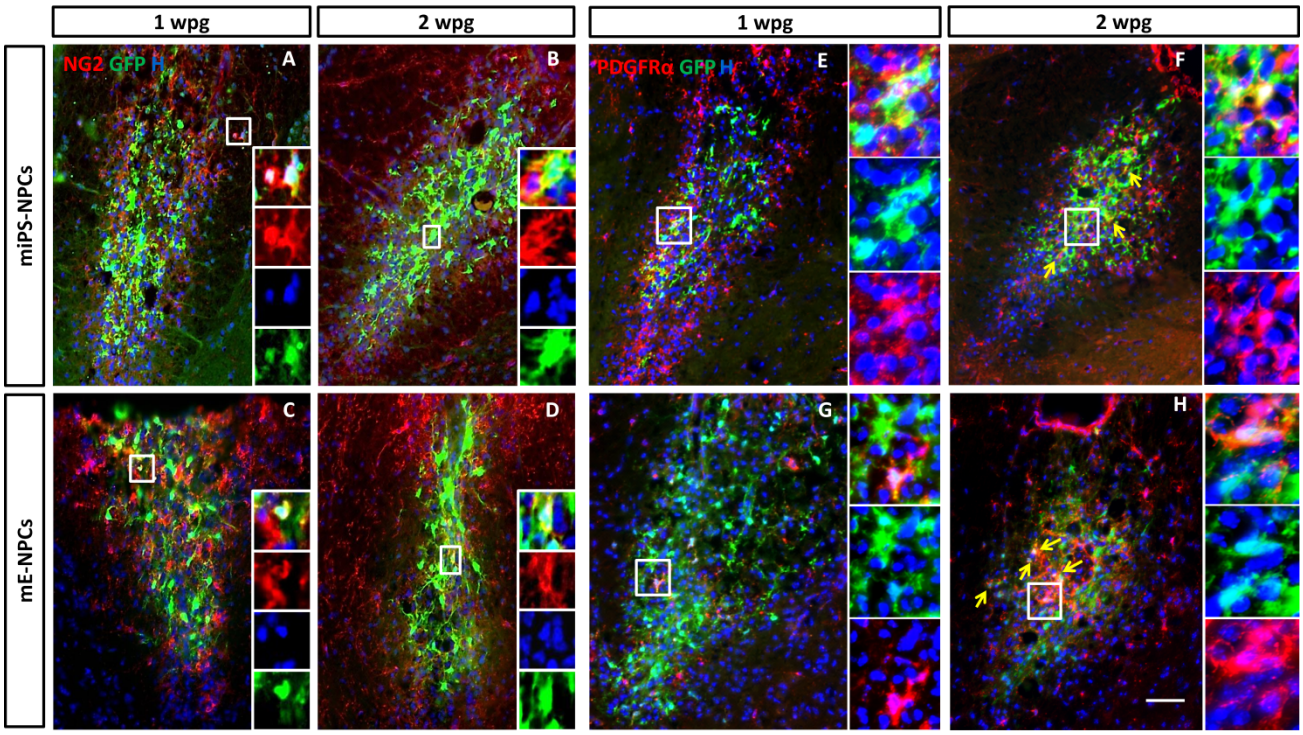

Figure S4. miPS-NPCs expressed oligodendroglial markers as soon as exposed to demyelinated axons in adult nude mice.

(A-H) miPS-NPCs (A, B, E and F) and mE-NPCs (C, D, G and H) expressed OPC markers as of 1wpg in demyelinating condition: (A-D) NG2. (E-H) PDGFRα. n = 3-4 mice per each group. H: Hoechst dye; wpg: week(s) post graft; Scale bar: 50μm.

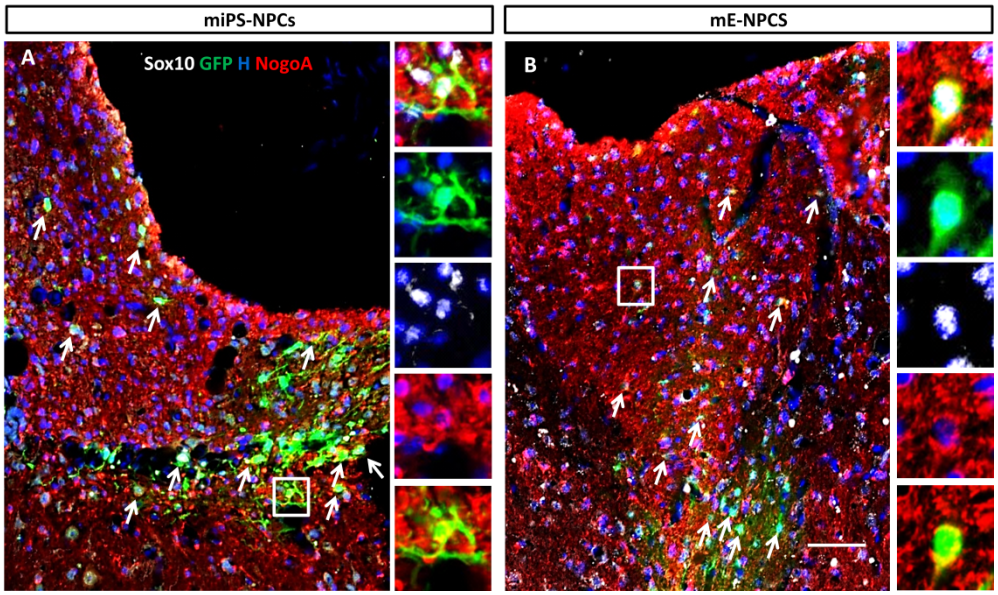

Figure S5. The majority of miPS-derived cells show oligodendroglial fate after transplantation in adult demyelinating conditions.

(A, B) Coronal sections of dorsal funiculus of demyelinated *Shi/Shi:Rag2*$^{-/-}$ mice at 6wpg with (A) miPS-NPCs and (B) mE-NPCs show that numerous GFP+ cells were Sox10+ (white) and NogoA+ (red) mature oligodendrocytes. n = 3 mice per each group. H: Hoechst dye; Scale bar: 50μm.

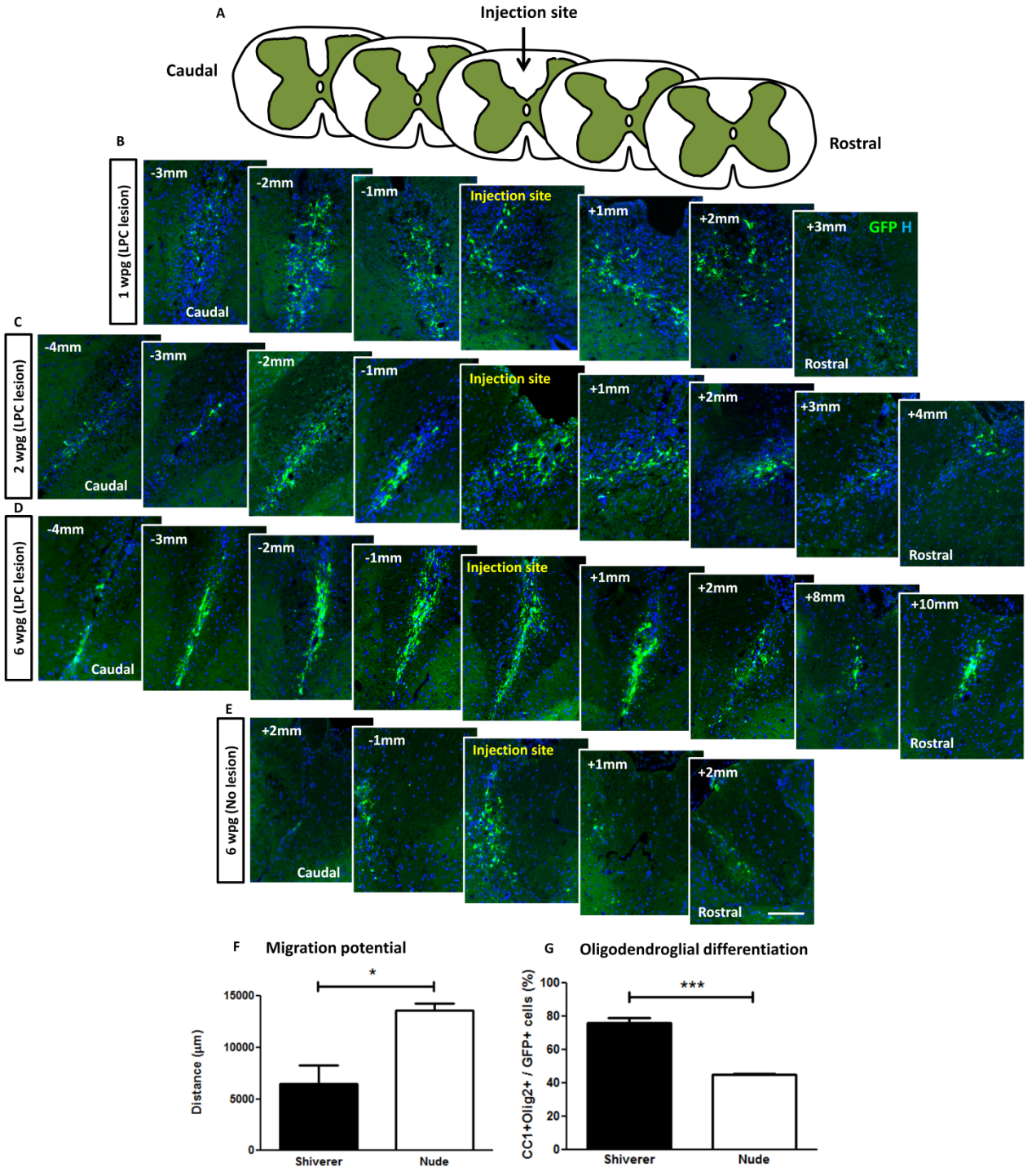

Figure S6. miPS-NPCs migrate more and differentiate less in nude compared to *Shi/Shi:Rag2*$^{-/-}$ mice.

(A) Schematic representation of serial coronal sections of the adult spinal cord. Total 12 µm coronal sections (including the injection site) were collected from each animal and the distance between the most rostral and caudal sections containing GFP+ cells was calculated. (B-D) Migration of miPS-derived cells in nude mice at 1, 2, 6wpg respectively. Cells migrated as a function of time (See Figure 5D). (E) In the absence of lesion, miPS-NPCs remained closer to the injection site. (F, G) miPS-NPCs migrated less (F) but differentiate more into mature oligodendrocytes (G) in *Shi/Shi:Rag2-/-* compared to nude mice (See Figure 4A and Figure 3Aiii). Student's t-test was used for the statistical analysis (n = 3-4 mice per each group). * $P < 0.05$, *** $P < 0.001$. H: Hoechst dye; wpg: week(s) post graft; Scal bar: 100µm.

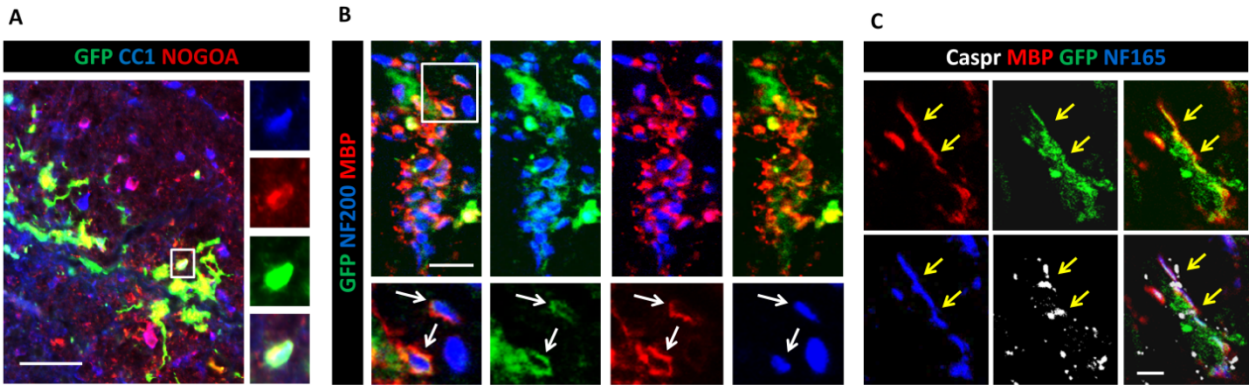

Figure S7. miPS-NPCs produce functional myelin in demyelinated myelin-wild type nude mice.

(A) CC1+ mature oligodendrocyte derived from miPS-NPCs also expressed NogoA 6wpg. (B) Further immunolabling on coronal sections from demyelinated nude mice revealed that processes of GFP+ oligodendrocytes wrap around host axons (blue) while expressing MBP+ (red). (C) a longitudinal view shows integration of graft-drived myelin (GFP+MBP+) into paranodal structure (Caspr+, white) of a host axon (NF165+, blue). n= 3-4 mice per each staining. Scale bars: 50µm in A and 5µm in B and C.