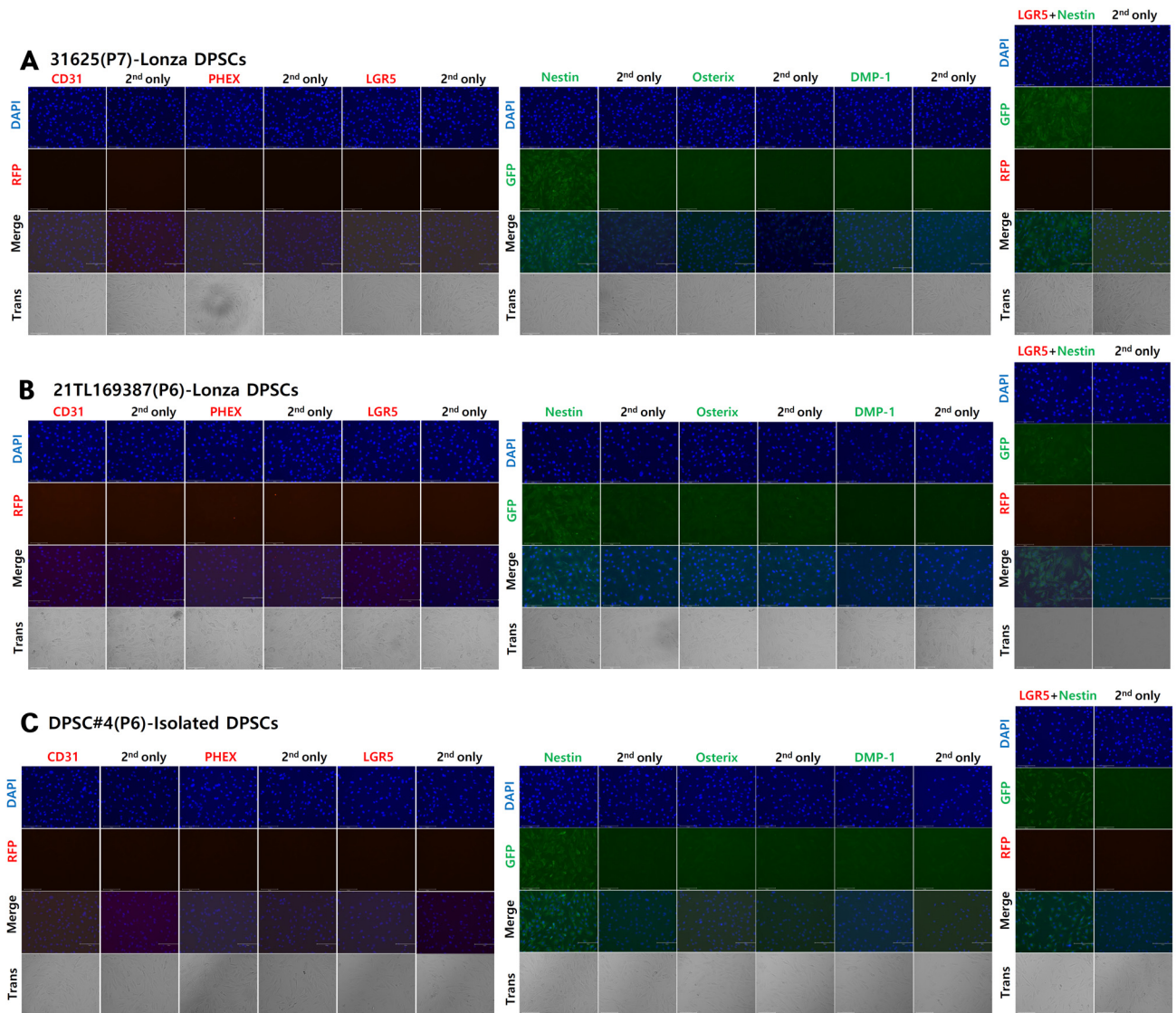


**Supplementary Fig. S1.** Three-dimensional (3D) Explant culture without the 1st Matrigel. The absence of the basement Matrigel resulted in 2D cellular outgrowth. Whole mount images of human dental pulp tissue cultured for 4 weeks without the 1st Matrigel is shown. Scalebar=200  $\mu$ m.



**Supplementary Fig. S2.** Immunocytochemistry analysis of two-dimensional (2D) cultured dental pulp stem cells (DPSCs). 31625 (A) and 21TL169387 (B) are DPSCs purchased from Lonza, DPSC#4 (C) is the primary dental pulp cells. After 2 days of conventional 2D culture, DPSCs were subjected to immunocytochemistry analysis for the marker expression; CD45 (hematopoietic stem cell marker), CD31 (endothelial cell marker), Nestin (MSC marker), PHEX (odontoblast marker), Osterix (mineralization marker) and DMP1 (dentin matrix marker). Nucleus was stained with 4',6-diamidino-2-phenylindole (DAPI). Scale bar = 150  $\mu$ m. RFP: red fluorescent protein, GRP: green fluorescent protein.