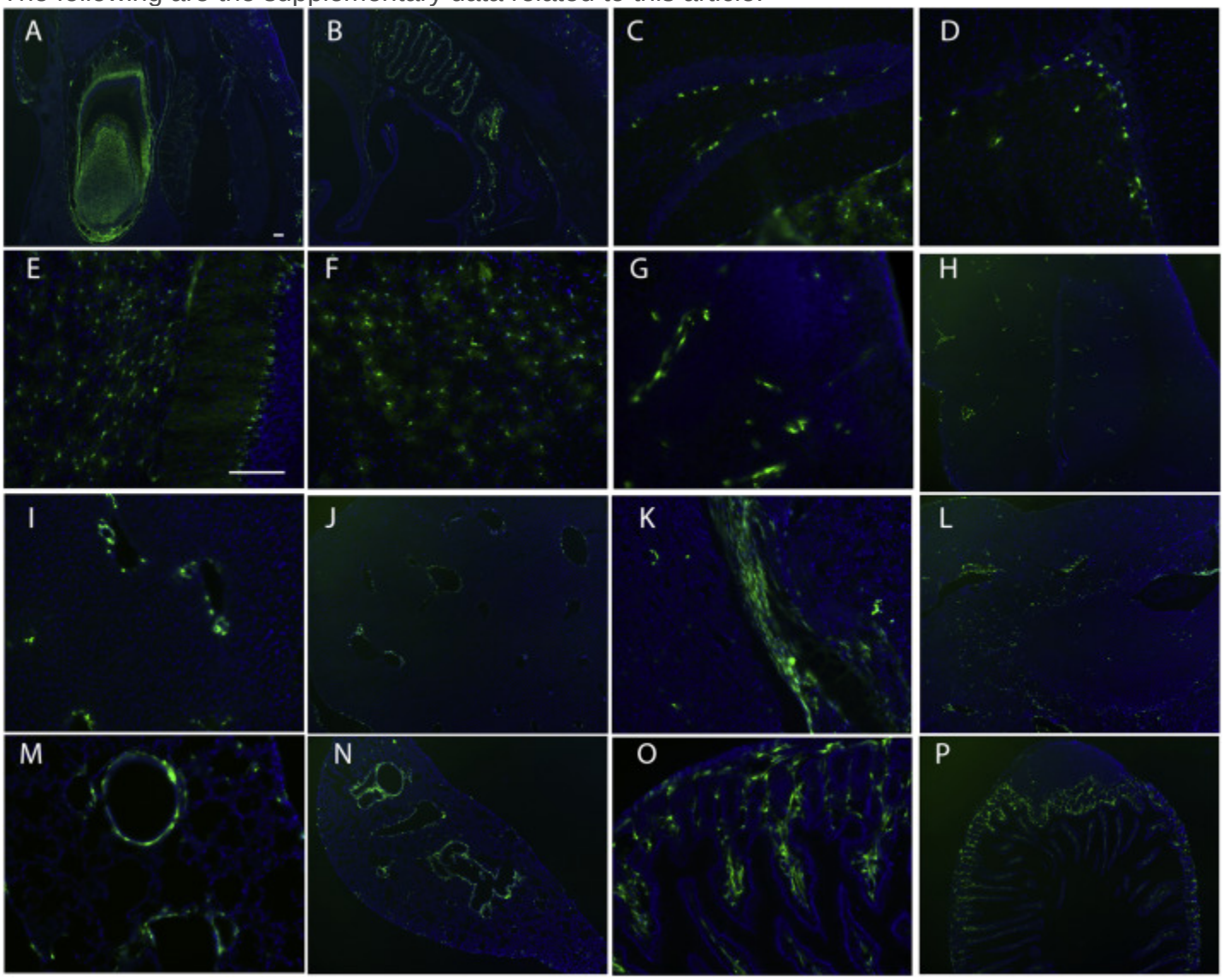
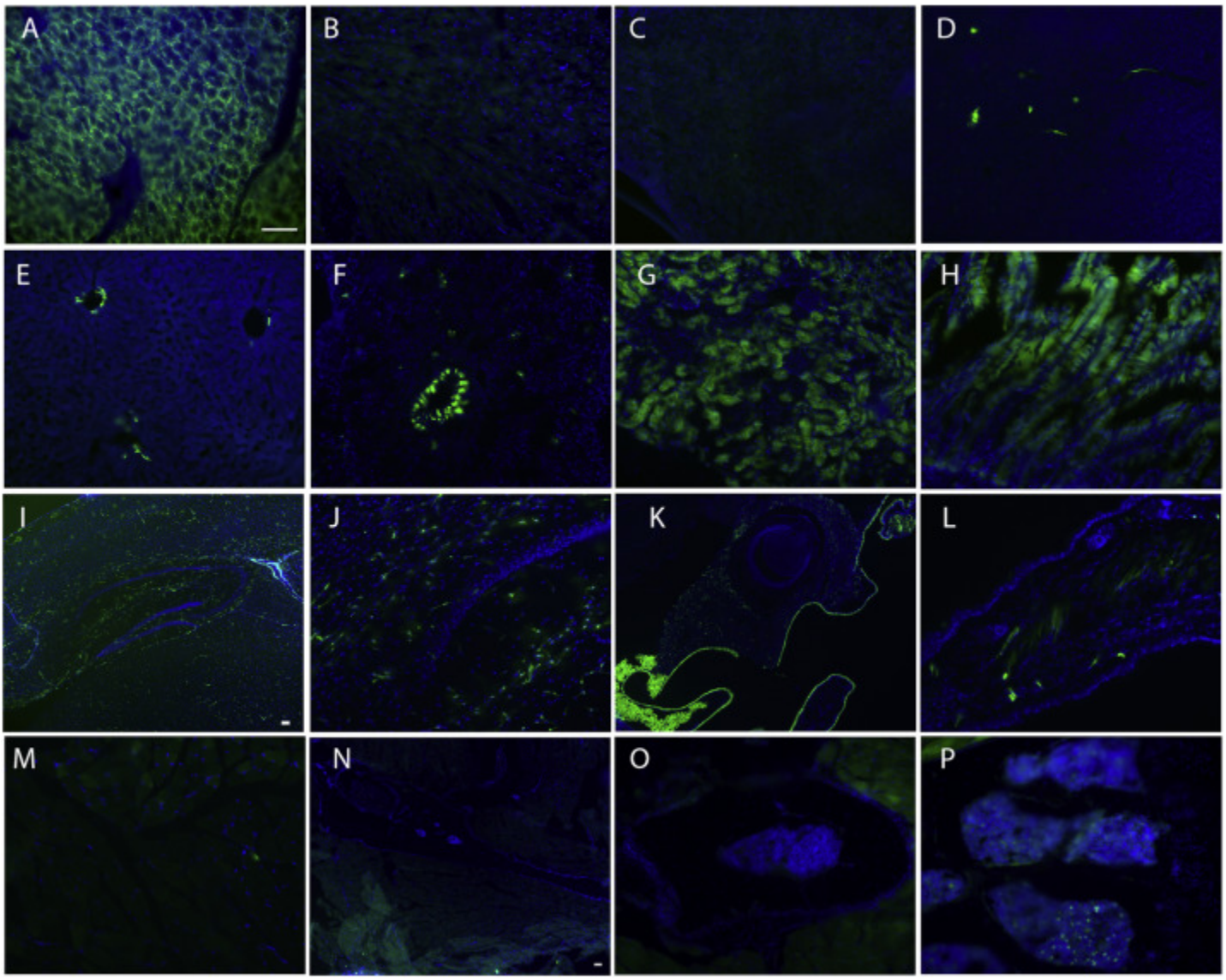
The following are the supplementary data related to this article.



Supplementary Fig. 1. Gli1-creERT labeled cells were found in all tested tissues.

Representative images from (A)tooth, (B) skull, (C–F) brain, (G & H) spleen, (I & J) liver, (K & L), kidney, (M & N) lung, and (O & P) jejunum of Gli1-creERT;Zsgreen mice show general patterns of labeled cells in different tissues: (A) low power image from a skull section at the tooth level, which served as the positive control for Gli1-creERT labeling. As expected, most cells in the tooth are positively labeled, while most tissues that surround it are negative for labeling. (B) low power image from a skull section that at the level of nasal cavity. There were generally two types of positively labeled cells, i.e., some Gli1-creERT labeled cells are located in the submucosal mesenchymal tissue closely associated with nerve bundles, blood vessels, and connective tissue, and others are located in the single epithelial layer with the morphology of columnar epithelial cells. (C–F) representative images from different brain regions. (C)

Consistent with previous reports, in the hippocampus the Gli1-creERT labeled cells are located in the subgranular layer and have the morphologic features of neural stem cells, (D) Gli1-creERT labeled cells are located in the subventricular zone and have morphologic features of neural stem cells, (E) in cerebellum, Gli1-creERT labeled cells are located in the Purkinje cells layer with feature of Purkinje cells, (F)in ventral brain, most Gli1-creERT labeled cells have morphologic features of astrocytes. (G & H) representative low and high power images of spleen. Most Gli1-creERT labeled cells are closely associated with blood vessels and connective tissue. (I & J) Representative low and high power images of liver. Most Gli1-creERT + cells are associated with the central vein. (K & L) representative low and high power images of kidney with two types of Gli1-creERT labeled cells, i.e., isolated Gli1-creERT labeled cells that were closely associated with vasculature, and fibroblast-like cells that formed clusters in the interstitial space. (M & N) representative low and high power images of lung. There were also two types of labeled cells, i.e., isolated Gli1-creERT labeled cells were associated with vasculature, while the majority of the Gli1-creERT labeled cells seemed to be closely associated with the mesenchymal component of secondary and tertiary bronchi. (O & P) representative low and high power images of jejunum. Most Gli1-creERT labeled cells are located in the submucosal mesenchymal tissue that is closely associated with nerve bundles, blood vessels, and connective tissue. Scale bar = 80 μm, A, B, H, J, L, N & P share the same scale bar, and C, D, E, F, G, I, K, M & O share the same scale bar.



Supplementary Fig. 2. CD133-creERT labeled cells were found in most tested tissues.

Representative images from (A) salivary gland, (B) heart, (C) spleen, (D) thymus, (E) liver, (F) lung, (G) kidney, (H)jejunum, (I&J) brain, (K) skull, (L) ear, (M) skeletal muscle, and (N–P) long bone of CD133-creERT;Zsgreen mice show general patterns of labeled cells in different tissues: (A) a representative image from salivary gland, which served as the positive control for CD133-creERT labeling. As expected, most cells in the gland are strongly labeled. (B) Representative image off heart where labeled cells are essentially undetectable. (C) in spleen, labeled cells also are essentially undetectable, (D) in thymus, isolated labeled cells are associated with vasculature, (E) in liver, most labeled cells are closely associated with the central vein, (F) in lung, most labeled cells with the morphology of columnar epithelial cells are located in the epithelial compartment of secondary and tertiary bronchi, but not the mesenchymal compartment. (G) in kidney, there are many labeled cells with the morphology of columnar

epithelial cells located in the epithelial compartment. (H) Similarly, in jejunum, there are also many labeled cells with the morphology of columnar epithelial cells located in the epithelial compartment. (I&J) low and high power images from sagittal brain sections, showing the general labeling pattern in the area of the hippocampus. (K) Representative low power images of skull. Note that many labeled cells with the morphology of columnar epithelial cells are located in the epithelial compartment. (L) Representative image of ear. Note that there are isolated labeled cells in skin, and few muscle fibers also have labeled cells. (M) In skeletal muscle, the labeled cells are rare. (N–P) Low and high power images from longitudinal (N) and cross (O & P) sections of long bone. Note that the labeled cells are only found in bone marrow. Scale bar = 80 μm, A, B, E & F share the same scale bar, and C&D share the same scale bar.